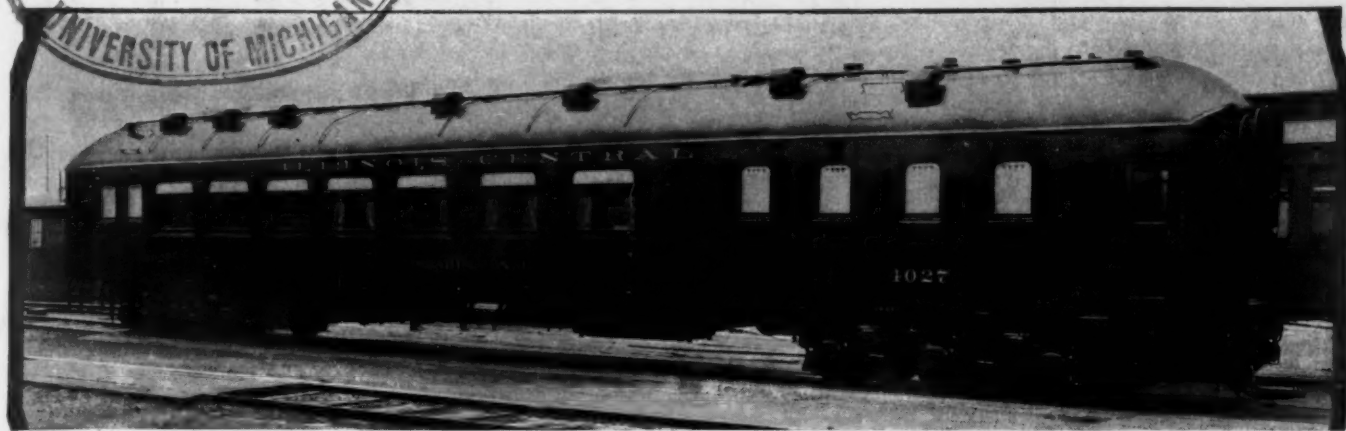


JULY 13, 1929

# Railway Age

FOUNDED IN 1856



Library-lounge car of the "Daylight Special" of the Illinois Central System operating Chicago—St. Louis, Equipped with "Isothermos" Journal Boxes.

## ISOTHERMOS

The Modern Universal Journal Box



One of the Trucks of the "Daylight Special" Lounge Car

Latest European Orders Just Received.  
French Northern Railway (Chemin de Fer du Nord)  
17,040 Isothermos Boxes.  
Belgian State Railway—800 Isothermos Boxes.



**ISOTHERMOS CORPORATION OF AMERICA**

11 West 42nd Street

Telephone: Pennsylvania 4816

New York City



Our technical control from forest to final loading by experienced engineers makes certain the furnishing of sound, decay-free poles with uniform penetration of creosote oil

*They have proven their worth in service*

*Quick shipments can be made from stock.*



**International Creosoting & Construction Co.**

General Offices—Galveston, Texas

# ***International*** **Creosoted Yellow Pine Poles**

Published weekly by Simmons-Boardman Publishing Company, 34 North Crystal Street, East Stroudsburg, Pa. Entered as second class matter, March 9, 1928, at the Post Office at East Stroudsburg, Pa., under the act of March 3, 1879.  
Address communications to 30 Church St., New York City.



# Railway Age

Vol. 87, No. 2

July 13, 1929

Table of Contents Appears on  
Page 5 of Advertising Section

## Wheat Rates and Prices

THE reductions in the rates on export wheat made by the railways in May constituted one of the most interesting and important experiments in rate-making ever made in this country. For many years there has been controversy over the question of whether the farmer or the consumer pays the freight rates on farm products. It has been an almost universal belief among farmers that the price of wheat has been fixed at Liverpool by the competition of the producers of the world in that market, and that the price received by the farmer in the United States always has been practically the price at Liverpool, less the rail and ocean freight rates from the point of production to Liverpool. On this theory it has been assumed that there would be a change in the price received by the farmer in the United States almost exactly equivalent to any change that was made in the freight charges from the point of production to Liverpool. This theory has been repeatedly attacked by persons who have contended that the consumer usually pays the freight, and that therefore a reduction in freight charges usually would result in a reduction of the price paid by the consumer, and not in an increase in the price received by the farmer.

There was a large accumulation of wheat in the elevators and also on the farms in this country last spring. Spokesmen of the western farmers urged the railways to reduce their rates on export wheat for the purpose of moving this accumulation out before the new crop came to market, and to enable farmers to get a higher price for wheat than they would otherwise receive. Finally the national administration, through the secretary of agriculture, made a direct appeal to the railways for a voluntary reduction of rates to meet the emergency which was claimed to exist. The desired reductions were made; but, at the same time, spokesmen for the railways intimated that they did not believe the farmer would be benefited, but that on the contrary, the result would be a decline in the price of wheat corresponding to the reduction in rates.

The first announcement that the reductions in rates would be made appeared in the newspapers on May 2. A reduction of  $3\frac{1}{2}$  cents per 100 pounds between Lake Erie ports and North Atlantic ports went into effect on May 12, and a proportionate reduction from Chicago and St. Louis to North Atlantic ports on May 29. The western lines made the following reductions, effective from May 29 to September 30: Missouri river to Chicago, Mississippi river to Mississippi river, and St. Louis and Minneapolis to Chicago, 6 cents per 100 pounds; Missouri river to the gulf,  $11\frac{1}{2}$  cents; St. Louis to New Orleans,  $5\frac{1}{2}$  cents. In effect, the reductions from the principal wheat growing sections to the various ocean ports were equivalent to the  $11\frac{1}{2}$  cent reduction made from the Missouri river to the gulf.

If, therefore, there had been no change in price at Liverpool there would have been an increase of  $11\frac{1}{2}$  cents per 100 pounds in the average price passed along to the western farmer for export wheat subsequently sold by him. The theory generally accepted by the farmers and their spokesmen has been that the price received by the farmers for wheat consumed in the United States was determined by the price at Liverpool. On this theory, the reduction in freight rates should have resulted in an increase in the price of all wheat in this country.

### *The Decline in Wheat Prices*

The mere announcement of the proposed reduction in the freight rates on export wheat by the railways of the United States was followed quickly by a decline in the price of wheat throughout the world. In the week ended April 27 the price of May wheat on the Chicago market ranged from 111 to  $114\frac{7}{8}$  cents; in the week ended May 11 the range was  $102\frac{3}{4}$  to 110, and in the week ended June 1, it was from  $93\frac{1}{4}$  to  $100\frac{3}{8}$ . July wheat, in the week ended April 27, ranged on the Chicago market from  $115\frac{3}{4}$  to  $119\frac{1}{8}$ , and in the week ended June 1, from 96 to  $103\frac{3}{4}$ . There were corresponding declines on the Liverpool market. The range at Liverpool for May wheat in the week ended April 27 was  $120\frac{3}{8}$  to 123. The price steadily declined until, during the week ended June 1, it was  $111\frac{1}{4}$  to  $112\frac{7}{8}$ . The range for July wheat in the week ended April 27 on the Liverpool market was  $126\frac{1}{4}$  to  $128\frac{5}{8}$ . In the week ended June 1 it was  $110\frac{3}{4}$  to  $115\frac{7}{8}$ .

The week ended June 1 was the one in which the reduced rates of the railways of the United States went into effect. The figures given show that between the time the reductions of rates were announced and the time when they were all effective the declines in the prices of May wheat on both the Chicago and Liverpool markets ranged from  $9\frac{1}{2}$  cents to  $11\frac{1}{8}$  cents, and were thus almost equivalent to the reduction of  $11\frac{1}{2}$  cents made on export wheat by the railways of the United States. The declines in July futures on both the Chicago and Liverpool markets were considerably greater. The Canadian railroads made reductions in rates equivalent to those of the American railroads, and the price of wheat declined in Winnipeg about the same as it did in Chicago. It also declined correspondingly at Buenos Aires, Argentina. Canada and Argentina are, of course, the principal competitors of the United States in exporting wheat.

It would be difficult to convince any rational and impartial mind that there is no significance in the fact that a decline in the price of wheat at both Chicago and Liverpool almost exactly equivalent to the reduc-

tions of the freight rates on export grain made in this country occurred during the very period between the time when the reductions were announced and the time when they went into effect. There have subsequently been advances in the price of wheat at both Chicago and Liverpool. The range of July wheat at Chicago in the week ended July 6 was  $114\frac{1}{8}$  to 123, while at Liverpool it was  $123\frac{1}{4}$  to  $134\frac{1}{2}$ . Did this give the farmer the benefit of the reduction in freight rates? As the price of wheat declined in May approximately the amount of the reduction in the freight rates, it seems a reasonable presumption that it would not have declined in May as it did if the freight rates had not been reduced, and that it would recently have increased as much as it has. In that case, American wheat producers and dealers would now be receiving prices approximately  $11\frac{1}{2}$  cents per 100 pounds more for wheat than they actually are receiving, and the railways would be receiving as much revenue for the transportation of wheat as if the rates had not been reduced.

### *Who Pays the Freight Rate?*

Who pays the freight rate on wheat? The *Railway Age* always has contended that in practically all cases the consumer finally pays the freight rate. This view is generally accepted as to most commodities. For some reason it has been assumed by many persons that there is some difference between farm products and other products which results in the farmer paying the freight rates on his products. For at least a half-century there have been frequently recurring demands for reductions in the rates on farm products upon the theory that this would result in the farmer getting higher prices for his products. It is certain that since the reduction of wheat rates the railways of the United States have been earning less money than they otherwise would have for carrying wheat. It is certain that ever since the reduction of rates was made foreign consumers have been getting wheat for lower prices than they were paying before. It is certain that the American farmer has not received the higher price for wheat which it was predicted by those who advocated a reduction of freight rates that he would receive if the freight rates were reduced. In other words, the wheat producers and dealers of the United States actually have received less for wheat than they were receiving before; the railways of the United States have received less for hauling it, and the foreign consumer has got wheat cheaper.

If these undeniable facts tend to prove anything clearly it is that the consumer, and not the farmer, pays the freight rate on export wheat, and that the result of a reduction in the rate is to benefit foreign consumers at the expense of American railways. Does the consumer pay the freight rates on other farm products? In the long run, and generally speaking, he does. Who pays the rate in any particular case depends upon conditions, and especially upon supply and demand. There exist conditions at times as a result of which an advance in freight rates would be made at the temporary cost of the producer, and a reduction of rates would temporarily benefit him, but in the long run if rates are fairly adjusted as between different producing territories and markets the freight rate will be merely one of many costs of production and marketing covered by the prices that consumers pay for commodities.

This is as true of farm products as of commodities of any other kind. The widespread belief that a general reduction of freight rates on farm products would increase the prices received by the farmers for their prod-

ucts is one of the greatest economic hoaxes of the age. Probably it has been responsible for more anti-railway agitation than any other single cause. If the experimental emergency reduction of rates on export wheat will help to destroy it the reduction will be worth all it is costing the railways.

## Spending Money Wisely

WITHIN recent years, the Boston & Maine has spent large sums of money for additions and betterments. The results have been apparent in every operating factor, and the transportation showing made has amply justified these expenditures. In this campaign to improve its operations, the Boston & Maine has left nothing to chance. Before any improvement has been authorized it has been considered from every possible angle, while the prospective benefits have been estimated and analyzed as closely as possible in advance.

But, even with the assurance given by this advance preparation, the Boston & Maine has not rested content. The bureau of statistics checks the results obtained from all expenditures over \$5,000. This check is a comprehensive one and includes an analysis of all possible factors likely to be favorably influenced by the expenditures made. The value of such a check on expenditures is obvious. It practically guarantees that the facility, for which the expenditure was made, will be used to its utmost capacity. At the same time, it indicates clearly the type of improvement that produces the best results, and supplies an invaluable guide for future expenditures for additions and betterments.

## The Mexican Electrification

AN article appearing in this issue deals with the economics of the electrification of the Mexican Railway. All such studies necessarily fall somewhat short of what both the author and reader would like to have, because conditions on the road change before a comparison can be made, and because cost records available do not include all comparable factors. In this case, however, the cost data available for one section of the line are unusually complete. Unfortunately the figures available cover only two months operation and, since the costs of labor, materials and fuel are those peculiar to Mexico, some interpolation is necessary for making comparisons. The tables showing comparative details of costs offer much information. In analyzing them, it must be remembered that the electric system is being compared with an antedated steam installation. This does not alter the interest on invested capital earned by the new equipment, but it has a direct bearing on the suggestion in the latter part of the article.

Here the author states that if steam locomotives had been used in place of electric, they would cost as much as electrics and that the cost of electric locomotives may therefore be subtracted for purpose of comparison, with an indicated earning of 47 per cent instead of 26 per cent. This assumes that the performance of the new steam locomotives would be the same as that of the old ones. Actually improved performance of new steam power would affect practically all costs and the suggestion is not worthy of the rest of the article. Except for these discrepancies, the article is comprehensive and the figures given are accompanied by unusually good supporting data and information.



## How Rapidly Do Transverse Fissures Form in Rails?

WHILE transverse fissures have been discovered in rails of all weights, sections and metallurgical classifications over a wide range of ages in track, it was believed until recently that their generation and growth were relatively slow. There was, of course, no way of knowing how long it took a fissure to reach the size attained at the time of its discovery, since its presence was concealed until it had attained such dangerous proportions as to afford surface presentation or to result in the actual failure of the rail. However, since the advent of the transverse-fissure detector, facts brought out in the course of its use have led to the tentative conclusion that these concealed defects in rails may grow within a few months' time from a size that is barely capable of being recorded by the device to a magnitude that gives promise of an early rupture of the rail. Evidence to support this conclusion, and from an entirely independent source, was recently brought out in the investigation of a train accident caused by a broken rail. Instead of but one transverse fissure, the one responsible for the accident, it was found on this line that there had been a considerable number of such failures in rails that were but 20 months old. To quote James E. Howard, engineer-physicist of the Bureau of Safety, "the display of transverse fissures at the early age of one year and eight months is disquieting." This is the more impressive since physical examination and chemical analysis disclosed no data to support any explanation for the more rapid growth of these defects in these particular rails than in others. The disclosure of evidence of rapid growth serves to intensify the problem of the transverse fissure and complicates the efforts being made to eliminate from important tracks all rails having a suspicious history.

## Need for Signals Not Based On the Number of Trains

THE justification for the installation of automatic block signaling is not based entirely on the number of trains operated over the division under consideration. Much of the daily train movement over a certain territory may be concentrated in a period of a few hours. On divisions near large terminals, or on sections in the middle of important over-night runs where many trains meet, heavy train density may exist for short periods. The importance of reducing delays and increasing the safety of train operation in such territories are of perhaps greater significance than the total number of trains in the 24-hour period. Faster schedules of both passenger and freight trains demand that trains be moved out on the line whenever they are ready to go; holding them in some yard until conditions are most favorable for a satisfactory line-up of meets with other trains on the road is to be avoided. Automatic signals permit the closer spacing of trains and thereby increase track capacity and enable more trains to move in one territory at the same time.

One railway maintains a traffic-density chart, on lines handling important traffic, and when the number of trains on a single-track line approaches 24 per day an investigation is made to determine whether signals are

justified. This has resulted in extensive installations of signals on this road in recent years. On the other hand, a recent investigation of the traffic on a short suburban passenger line handling as high as 64 trains a day led to a different conclusion. The trains on this line move into the city in a procession at comparatively low speeds in the morning and move out in the evening in the same way. Based strictly on the benefits to be secured, those making the study could find no justification for signals. It will be seen, therefore, that the schedules of important trains, the class of traffic and the train density at certain times may have an important influence on the decision to install signals. However, if the average single-track line is handling as many as 24 trains a day without automatic signals it would seem advisable to ascertain what benefits may be secured by signals.

## Accounting for Stores Expenses

THE Railway Accounting Officers Association has recommended to the Interstate Commerce Commission the creation of a primary account for stores expenses, in lieu of the present method of accounting for such expenses through a clearing account. At this time it is not possible to forecast whether the primary account will ever be established or what action will be taken in this connection. The known fact is that the Interstate Commerce Commission is holding in "tentative abeyance" the recommendation of the accounting officers.

The proponents of the primary account believe that it would produce results that would be helpful from a supervisory standpoint. Among the objections raised to it is the difference in the organization of stores work on various railroads and even at different points on the same railroad. For instance, in some shops all material delivery may be handled by the stores department and the expense can readily be so charged. In others, however, mechanical department employees may perform this service and the allocation of charges as between maintenance of equipment expense and stores expense becomes rather more complicated. Apparently, if the proposed new primary account is approved by the commission, setting it up and devising procedure for keeping it properly will call for genuine experience and ability in railroad accounting.

The accounting departments have by close contact with other departments studied and endeavored to provide for their needs for significant and accurate accounts and statistics. The result has been that railroad accounting and statistics, as developed on the North American continent, have reached an enviably high plane of usefulness and accuracy. This result has been achieved entirely by co-operation—the operating department, or other account-using departments, making fully known their requirements for information and assisting in collecting the basic data; and the accounting department, with its specialized technical knowledge and lack of bias in favor of or opposed to other railroad departments, assembling and correlating this information into useful and authoritative accounts and statistics. Similar cooperation between the purchasing and stores department and the accounting department will assure the maximum attainable accuracy in and usefulness of the proposed new stores expense account, provided railroad officers and the commission can come to an agreement regarding its usefulness and desirability.

## Further Growth in Truck Movement of Perishables

**I**N a statement issued to the press on June 19, the United States Department of Agriculture presents some further evidence of the growing volume of freight transportation which is being performed by motor truck. A survey of the situation in Delaware and the Eastern Shore of Maryland in 1928 showed 44,616 carloads of perishables moved by rail and the estimated equivalent of 7,327 carloads—or 14 per cent of the total—moved by truck. For some specific commodities the percentage moved by truck from Eastern Shore points was even higher. The equivalent of 2,396 carloads of strawberries, for instance, moved by truck as compared with 2,121 carloads moved by rail and boat. In 1926 the railroad movement totaled 2,862 cars, as compared with the equivalent of only 1,086 carloads which went by highway, indicating an increase of more than 100 per cent in trucking in only two years.

Nor are these trucks restricting themselves to short hauls. The principal destinations of trucks from the Eastern Shore in 1928 were Philadelphia (average distance 125 miles) and New York (225 miles). Moreover, the statement of the Department of Agriculture gives little evidence that the growth of motor trucking as a means of transportation for perishables for relative long distance—100 to 200 miles—is uneconomic. Rather it appears that the trucks provide certain services which are helpful in marketing at least a portion of the crop—services which are of sufficient importance, apparently, to outweigh the obvious economy of rail handling when viewed from the standpoint of transportation alone. Some of the advantages claimed for the motor truck are: Direct handling from the farm to the retail store; elimination of delays and handling at shipping and receiving points; elimination of the necessity of refrigeration due to speedier handling; and the establishment of a closer contact between the farmer and the retailer.

Certain disadvantages of truck transportation are listed, among them being: Inability of the city dealer to determine accurately in advance what his supply will be; inability to hold produce over a day or two for more favorable prices (as is possible when shipments arrive in refrigerator cars); and the lack of uniform trucking rates. These disadvantages, however, the figures plainly show, have not been serious enough to prevent a tremendous growth in motor truck handling.

Truck transportation of perishables has, it appears, also the additional advantage of opening up new markets. Local dealers in small communities were formerly supplied, rather inadequately, through primary markets in large cities to which virtually all commercial production of perishables was shipped. Thus it often happened that the large cities were better and more cheaply supplied with fruits and vegetables than the rural districts which produced them. The motor truck, by supplying the local dealers in outlying sections direct from the farms, has greatly enlarged the market for such products.

That a great deal of freight transportation on the highways amounts to nothing more than uneconomic and unjustifiable competition with the railways cannot be doubted. At the same time, there is plenty of evidence to show that in many situations the motor truck not only has its advantages as a transportation medium, but also has others from a practical marketing standpoint which, for an important percentage of total

traffic, outweigh the appeal of the excellent transportation facilities offered by the railroads.

It appears certain, therefore, that, even if out-and-out uneconomic motor truck competition were eliminated, the railroads, if they should insist on providing rail transportation exclusively, would still have a formidable competitor in the motor truck. If the railroads wish to continue to have their corporate revenues expand in proportion as business and population grow, it would seem necessary for them to include motor truck transportation among their services. Says the Department of Agriculture in its statement referred to herein:

"The government marketing officials believe that, as in the case of motor bus and airplane transportation, it is only a question of a short time when the railroads, which have been facing increasing competition in motor truck transportation, both from producing areas to consuming markets and in the distribution of produce from cities to small towns, will organize transport systems which will furnish shippers and dealers with a unified service."

## Aid and Comfort for Passenger Air Lines

**T**HE railways are lending strong support to the development of the passenger business of the air lines, through the sale of tickets providing for co-ordinated rail and air transportation, and in some cases through the active promotion by their passenger departments of rail-air travel. There should be no misconception however, of the effect which the present railway support of the air lines will have on the railways' own business in the future. Travel by air is increasing, and air lines now serve many of the principal population and business centers in the United States. It is quite possible that air transportation will have a tendency to develop new traffic, and to this extent will not affect the passenger business of the railways. To a larger extent, probably, the air lines will secure traffic now being handled by the railways, and to this larger extent, the development of the business of the air lines will reduce the passenger revenues of the railways.

It is inevitable that air transportation will sooner or later assume a substantial position in the transportation system of the United States. Nothing that the railways could do would prevent this, but on the other hand, the active support which the railways are giving the air lines at this time is surely advancing the development of air transportation more rapidly than it would advance without such support. On this basis, the railways, by giving assistance to the air lines in their bid for traffic at this time, are by their efforts accelerating approach of the time when the air lines will handle a considerable volume of traffic now handled by the railways.

For this reason, it would seem advisable for the railways to take a financial interest in the air lines which they are supporting, in order that the revenues which they are helping to turn to the air lines may not be entirely lost to them. Some of the railways are known to have substantial interests in air lines already, but if many of the others have a similar interest in their aerial proteges, it is not generally known. But good business would appear to require that the railways share in the profits, if any, of the air lines in the same proportion that they give assistance to them.



# *How the Great Northern Carried* **Communication Circuits** *Through Electrified Territory*

## *Problems of Inductive Interference in Electrified Territory Solved*

By J. C. Rankine

Superintendent of Telegraph, Great Northern

**W**HEN planning communication circuits along an electrified railway three principal requirements must be met; first, safety of employees; second, preservation of equipment from damage; third, efficient and economical operation. The Great Northern electrification between Wenatchee, Wash., and Skykomish, presents exposures on the right of way to a trolley circuit carrying 11-kv., single-phase 25-cycle current throughout the electrified zone of about 70 miles, and similar exposure to a signal feeder circuit carrying 13.2-kv. single-phase 60-cycle current. With the exception of about 15 miles, where the trolley feeders follow a divergent route, there is also exposure to two trolley-feeder circuits of 44-kv. single-phase 25-cycle current. These various current supplies are all carried on the same line of trolley poles.

### **Tunnel Included in Electrified Zone**

Outside of the electrified zone, but supplying current for it, there is also an exposure to 50 miles of a 110-kv. three-phase 60-cycle circuit located on the right of way, or immediately adjacent to it. Included in the electrified zone is the longest tunnel in America (7.79 miles) and three short tunnels, varying in length from 600 to 4,000 ft. The 44-kv. circuit is carried outside each of the tunnels; the 11-kv. trolley and 13.2-kv. signal feeder go through the bore, the signal feeder being carried in cable in fiber conduit.

The communication circuits include the dispatcher's telephone and message telephone, both cut into all offices, and also operated simplex for telegraph; the long distance telephone circuit is not cut in locally, but is composited for telegraph and also repeated at one end of the electrified zone; two local Morse circuits are cut into all offices, and various through telegraph circuits, all operated duplex, and one tenant circuit is operated by printer. Printer operation is also being considered for certain of the duplexes. The through circuits are all operated between repeater offices at



*One of the Refuge Bays in the Tunnel—Note Local Phone*

Seattle, 85 miles west of Skykomish, and at Spokane, 175 miles east of Wenatchee. Any idea of changing the operation to metallic, instead of grounded telegraph, therefore, involves either similar changes on 260 miles of line outside of the electrified zone, or else the establishment of additional repeater offices at the points of transition from grounded to metallic operation and vice versa.

### **A Choice of Three Methods**

Three possible choices were available for the routing of the communication circuits: First, to continue ground telegraph operation in underground cable on the right of way, the installation of which would cost \$20,000 to \$25,000 per mile, and would necessitate free use of loading coils at a considerable rental charge. Second, to adopt metallic operation of telegraph, using aerial cable on the right of way, which would cost about \$8,000 per mile, necessitating the rental of loading coils, and two additional repeater offices, which would cost about \$8,000 to install and \$8,000 to \$10,000 each per year to operate. Third, to continue grounded telegraph operation, but to move the wire lines completely off the right of way, continuing open wire construction so far as possible, costing from \$2,500 to \$3,000 per mile, but increasing the mileage somewhat through the

necessity for returning to the right of way at every station for local service.

The third plan was finally adopted with some modification. A survey of the country showed possibilities of securing a fair physical separation along highway routes, and a fair degree of freedom from conflict with other wire-owning companies throughout the larger part of the electrified zone. In the territory exposed to the 110-kv. power line, open wire grounded operation was continued on the right of way, with an average separation of 75 ft., and with co-ordinated transposition schemes effective on both power and communication circuits. The transposition scheme took care of the induced hum on the telephones; the fact that the power line was 60-cycle permitted operation of the lower frequency telegraph signals without material interference, and sudden increases in the current values on the power line are comparatively rare, although when they occur, through grounding or shorting of the 110 kv. circuit, the induced surge is heavy enough to break down the protective devices on the communication circuits.

An extended series of tests indicated that a 50 per cent reduction in induced current values on the communication wires under normal operating conditions could be accomplished by a physical separation of 1,000 ft. and that this would permit of grounded telegraph operation. The induced voltage in the communication circuits at 1,000 ft. separation amounts to 0.041 volts per mile, per ampere of current in the trolley circuit.

Further tests in a previously electrified zone, the old Cascade Tunnel (2-5/8 miles), showed that the plan used there of carrying the communication circuits through the tunnel in a light steel armored cable, with the armor grounded, gave a shielding effect almost exactly equal to a physical separation of 1,000 ft. with open wire.

The greatest difficulty in securing efficient telegraph operation was the low frequency of the power supply, the normal frequency of the telegraph circuits of 11 to 15 cycles being quite close to the induced 25-cycle current. Experiments with various combinations of impedances indicated that it probably would be possible to provide a high impedance to 25-cycle current with a cut off point only slightly below 25, permitting the free use of the lower frequency telegraph signals without material interference. As yet, however, it has not been found possible so to adjust the balance as to be entirely satisfactory for the printer operation, at a frequency of 20 to 22 cycles, and the exposure to normal operating loads at certain points and under certain conditions still shows detected interference with the simplex type of printer.

The rebuilding of the communication circuits proceeded simultaneously with the electrical work, and the first section put into service, covering the western 13 miles of the zone, showed fairly satisfactory results.

Location on the highway gave an average separation of about 1,200 ft., but even then certain conditions of power load on the trolley produced an induced 25-cycle current on the telegraph wires which interfered with duplex transmission, owing to heavy current consumption on the trolley at points of less than average separation.

#### Cable Used Through Tunnel

East of this section was the long tunnel, around which open wire construction meant either a considerably longer route, or a location practically inaccessible in the winter time. The communication circuits were, therefore, carried through the tunnel in cable, which is of a standard type, composed of No. 13 gage "quadded" conductors, paper-insulated and lead-sheathed. The insulation requirements are those provided in A.R.A., T. & T. Sec., Spec. 1-A-9 for Type-H cable, except that the dielectric strength, as between conductors, is 2,000 volts. Three "quads" of the cable are loaded to the approximate equivalent of No. 9 gage open wire, with loading coils every 6,000 ft. The cable is enclosed in a 3-in. steel conduit, which is embedded in the concrete wall of the tunnel about level with the rail, and connected at each end of the tunnel to a substantial ground. A cast-iron pull box is located every 600 ft., around which the electrical conductivity of the conduit is preserved by means of a welded wire bond. Loading coil locations are at every tenth pull box, where a niche in the wall immediately above the box is provided for the coil case. The cable is terminated at each portal of the tunnel in a fireproof cable house of concrete and tile.

East of the tunnel the conditions for highway construction are less favorable, but an average separation of about 750 ft. was secured for the remaining 50 miles. All crossings of the right of way and most of the entrances to stations are in underground cable, either in steel conduit or in creosoted wood duct. The three short tunnels are avoided, by a route, in one case over the top, and in the other two around the hills at some considerable distance from the right of way. The elimination of cable, except in cases of absolute necessity was desirable in that it avoided the operation of protective devices at remote points and also irregularities in the impedance characteristics of the long distance telephone circuit, which would reduce the effective operating ratio of telephone repeaters.

#### Results Practically Satisfactory

The local telegraph circuits do not show any marked interference from 25-cycle induction. Apparently the presence of so many relays in the circuit introduces enough impedance in the line to prevent the free flow of the 25-cycle induced currents, and the inertia in the mechanical operation of Morse relays and sounders still further reduces the tendency to flutter at that frequency.

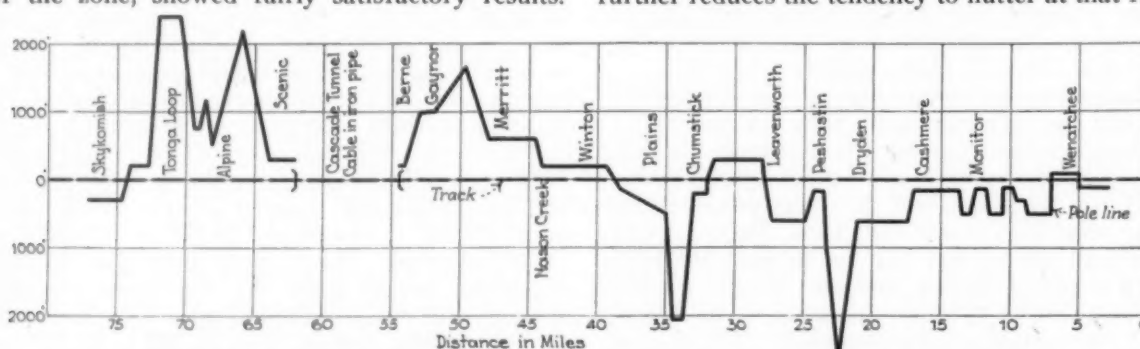


Chart Showing Horizontal Separation of Telegraph Line and Electrified Track



The duplexed circuits are affected much more, owing to the absence of any intermediate equipment, to the relatively greater efficiency of the polarized relays at high speeds, and to their greater sensitivity to alternating currents.

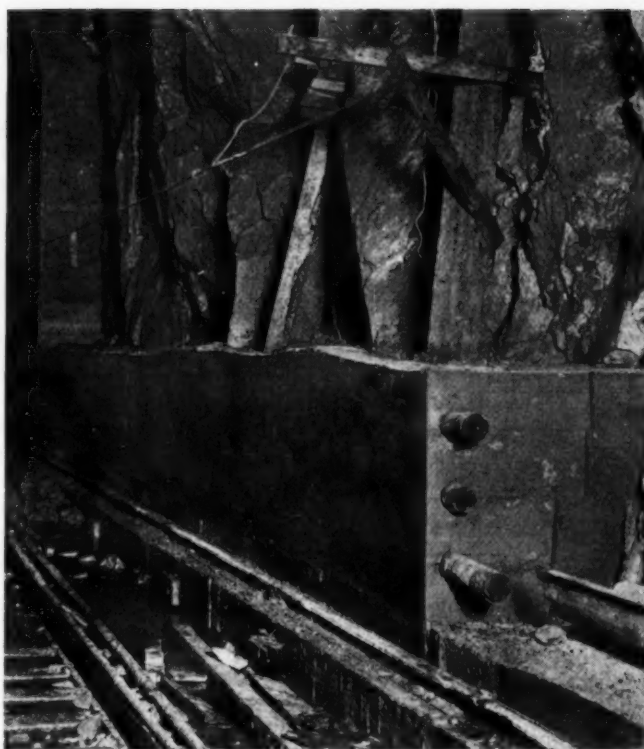
This interference is dependent upon the location of trains and the power necessary for their movement. A heavy train on a steep grade with a relatively small separation from the telegraph wires, makes duplex operation utterly impossible without further refinements. A Western Union Type-3-A resonant reactor was placed in series with the polar relay in the main line, and a similar reactor to balance it in the artificial line, with a 25-cycle resonant shunt across the main and artificial lines ahead of the reactors.

This combination has proved effective, and duplex operation with either manual or semi-automatic transmission is carried on without noticeable interference. Ordinarily the resonant shunt takes care of the situation under all normal operating conditions. However, when for any reason it is necessary to resort to stub-end feed on a section of the trolley, the reactor is also necessary. Reactors and shunt are connected through a three-way switch in such a manner that each circuit may be operated, either without special equipment, with the shunt only, or with both shunt and reactors.

Telephone circuits operate without any marked interference under ordinary operating conditions so long as transpositions are properly located and maintained. They are, of course, subject to interruption when some abnormal power condition induces a surge sufficiently strong to operate the protective devices. These must of necessity be positive in their operation, since the local telephone circuits are available to all operating employees at many points, and must be used under unfavorable conditions. Part of the electrified zone is in a territory of great precipitation throughout the year, and employees are likely to be using telephones when everything is dripping wet, and the danger from high-voltage is at a maximum.

#### Protective Devices Used

The standard type of carbon block protector has been effective in disposing of excess current, but the tendency to ground the line permanently at remote points is a great disadvantage. The induced voltages evidently are momentarily very high at times, as in the case of a short or ground on the trolley, or because of a flash-over, and are liable to ground the communication lines permanently at numerous protectors. To offset this, pole-type arresters of the argon-gas type have been installed generally to assist in draining off the momentary heavy charges. These arresters are spaced at distances varying from one to four miles, and have been of considerable help in reducing the number of



A Construction View Showing the Conduit in the Wall of the Tunnel

permanent protector grounds. An argon-gas arrester suitable for use with the standard mountings is being installed at all line cables, and at the pole end of drop cables in place of the carbon block arrester, to reduce still further the grounding of the lines, but the carbon type are being continued at the office end of drop cables, where apparatus is available for employees' use, with the idea that the most positive type of protection is essential there.

The tunnel cable, which is, of course, an exceedingly important unit, is protected at both ends by double sets of carbon protectors, with argon-gas protectors between the two sets, and argon-gas pole protectors on the open line approaching it. If high-voltage current should get into the cable and result in a burn-out, it

may be replaced in any 600-ft. section, there being a splice at each pull box.

The cable is carried through the entire length of the tunnel without any of the strands being brought out for service. Local telephone service within the tunnel is provided by means of a smaller rubber-insulated cable in a fiber duct, which is used also for the signal secondaries and is located in the wall opposite the main cable. This rubber cable also contains spare conductors, so that, if accidents befall the main cable, the dispatcher's telephone circuit can be patched through.

The tunnel contains a refuge bay every 2,400 ft., large enough to accommodate a large section motor car. A generator telephone, of the iron box mine type is located in each bay, and the circuit is terminated in the station at each end of the tunnel. In the station, provision is made not only for local use, but a switching arrangement is provided for connecting this phone circuit to any other through telephone circuit, so that in case of trouble of any kind within the tunnel, direct telephone connection may be had from the point of trouble to the dispatcher. Owing to its particular and severe exposure to high-voltage influences, each telephone on this circuit is operated through an insulating transformer insulated to withstand 25,000 volts between windings, and is adequately fused.

#### Construction and Maintenance

The location of so much pole line on highways necessitated a departure from the usual railway methods of construction and maintenance, and both activities are carried on by automobile and truck. By the use of a heavy duty truck, with a rubber-tired trailer, satisfactory pole distribution was secured. With the rear wheels of the truck and the trailer wheels equipped with bolsters revolving on a center pin, sharp curves in the mountain roads were successfully passed.

Each line maintainer is equipped with a light delivery automobile, as well as his rail gasoline speeder. In other than deep snow, better time is made in the clear-

ance of line trouble along the highway than on the right of way. This is sufficiently noticeable to indicate that more general use of automobiles on adjacent highways, even when the pole line is on the railroad right of way, may prove desirable.

The portion of the electrified zone at the higher elevations is subject to heavy snowfalls in winter. Each maintainer is equipped with both snow shoes and skis. While the number of cases of line trouble on these remote sections is relatively small, such trouble usually is caused by falling timber, and results in the loss of all circuits; a condition which can be cleared rapidly when it is once reached, but which it is not easy to reach when snow is deep.

## Grain Loading Heavy in the Southwest

WASHINGTON, D. C.

**A**LL previous records for grain loading in parts of the Southwest for the time of year were exceeded during the latter part of June and first days of July, due to early ripening of the wheat crop, an increase in the number of "combine" threshers and a somewhat increased market price which caused the movement of a considerable quantity of old wheat from country stations. This brought about a temporary tightening of the car supply, in spite of the large number of cars which had been provided in advance for the movement, but Chairman M. J. Gormley, of the Car Service Division of the American Railway Association, stated that as soon as the first turn is made in the cars there will be no difficulty in meeting the situation.

The Interstate Commerce Commission on July 9 made public a telegram received from Senator Brookhart of Iowa, complaining about the car supply but apparently more about the freight rates, together with a reply from Chairman Lewis of the commission. Senator Brookhart said he had found a "most critical and distressing wheat situation" in Oklahoma and Kansas, with great quantities of wheat already threshed, elevators filled and much piled on the ground. He said the market is inadequate "in part because freight rates are too high" and that "shipping facilities are also inadequate and the railroads are not furnishing the cars demanded." "This has created an emergency," he said, "that demands the most speedy and drastic action of the Interstate Commerce Commission," and he urged that it "consider these questions at once."

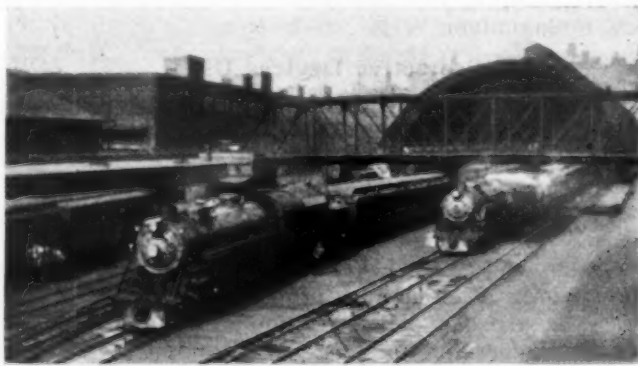
Chairman Lewis said that the grain car situation in Oklahoma, Kansas and other wheat growing states has been under close supervision since harvesting began and that action has already been taken to increase the car supply for grain loading on the Santa Fe and Rock Island. Orders are now in effect, he said, through the Car Service Division of the American Railway Association at Chicago, for diversion of all available serviceable box cars to the Santa Fe and the situation does not seem to be so critical on the Rock Island, Missouri Pacific and other carriers, but the service agents which the commission has sent into the wheat fields are keeping a close check on all carriers.

During the first three days of July, he said the Santa Fe received 1754 cars and during the previous week approximately 1,000 on these orders. All roads connecting at Chicago, St. Louis and Memphis are making a special drive to materially increase deliveries to both

the Santa Fe and Rock Island. Loading this year started off in unprecedented volume for so early in the season due to premature ripening of crop, combine harvesting and to the fact that with a somewhat advanced market price during the last few days considerable old wheat has moved from country stations. From June 15 to July 1 the Santa Fe loaded 11,875 cars, compared with 2,942 last year and 9,055 during the same period in 1927. This, he said represents the heaviest loading they have ever had so early in the season and similar conditions prevail on other lines. The commission has had service agents assigned to grain producing districts for the past two months. In addition the carriers have been urged to get western box cars home and put in condition for grain loading. With elevators filled and the large crop being harvested, Mr. Lewis said car shortage is bound to result if grain is held in cars for storage purposes instead of unloading. Reduced export rates on grain have been in effect since May 29 and the general grain investigation, (part 7 of Docket No. 17,000) is under active consideration.

Mr. Gormley showed from the records of the Car Service Division that the car supply on the lines in the Southwest is just as adequate as it was a year ago at which time there was the best car supply the railroads ever had. "The principal lines involved" he said, "the Rock Island and the Santa Fe, have in excess of their ownership of grain cars on line by reason of cars sent them from other roads. The very heavy increase in the number of combine threshers, coupled with the rather sudden maturity of the grain by reason of abnormal hot weather, forced a sudden movement of grain using up all of the grain cars stored in advance. All previous records in the loading for this time of year have been exceeded. The movement is largely to scattered milling districts making the return movement slow but as soon as the first turn is made in the cars there will be no difficulty in meeting the situation. Under orders of the Car Service Division and with the co-operation of the railroads direct with the lines interested from 500 to 700 cars per day have been turned over to the Santa Fe and Rock Island through Chicago, St. Louis and other gateways. It was not possible to have stored more cars than were stored in advance of the movement without seriously interfering with train operations. Shippers and grain interests through the advisory boards are fully informed of the situation and are co-operating fully in the terminal markets with the railroads in the unloading of grain cars." According to advices received by the Car Service Division there have been a few scattered complaints but shippers generally have not complained.

\* \* \*



Two Sections of the Baltimore & Ohio's "Capitol Limited" at Chicago





One of the Fruit Blocks on the Main Line of the Union Pacific

# Handling 11,000 Trains on Time

*Union Pacific keeps fast freight moving  
by carefully checking the runs*

**F**ROM December 20, 1925, to March 1, 1929, the Union Pacific moved 11,018 eastbound perishable freight trains, every one of which made schedule or better, thus establishing a record in the operation of freight trains that has probably never been equaled. The Union Pacific also handles several hundred thousand carloads of high class freight annually, other than perishable commodities. As an indication of the regularity of the service in the movement of this manifest freight during the year 1928, an average of only one car out of every 11,500 cars handled was delayed over 48 hours.

## Service Developed Gradually

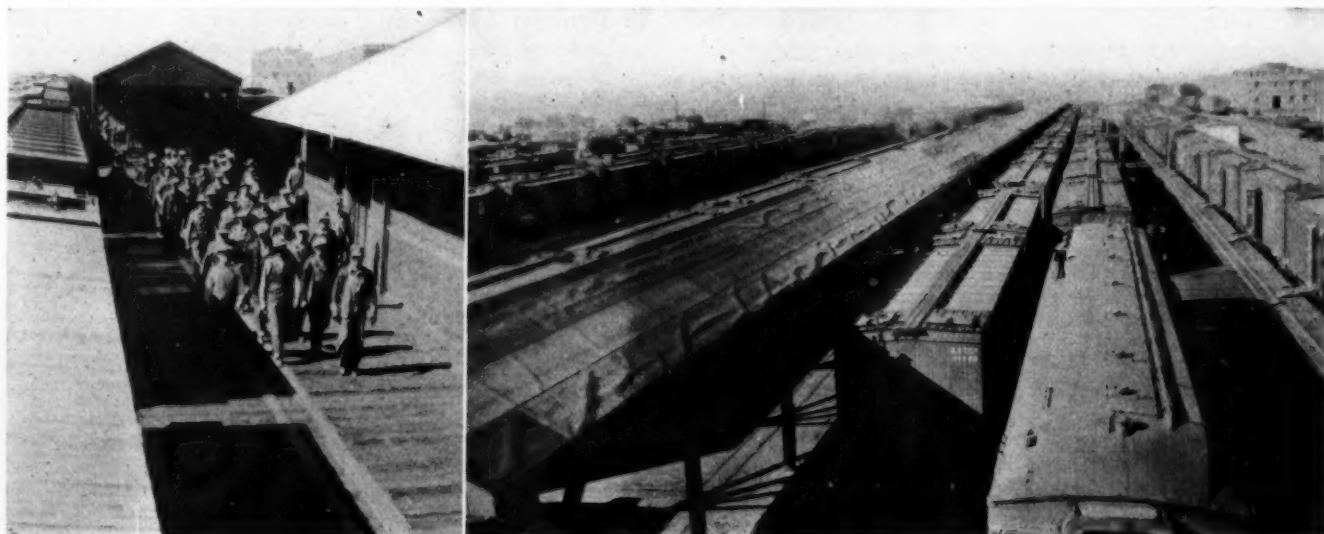
The regularity of performance of these fast freight schedules is the result of years of study and experience on the part of the operating department personnel, which has gradually developed the service until it has reached its present high state of efficiency. This has been accomplished by careful study of details, the elimination of causes that stand in the way of accelera-

tion, and the application of constant and intensive supervision over train and yard operations.

## Operating Methods

These trains are made up at designated terminals in accordance with prearranged plans, which call for a minimum of switching enroute and are thereby conducive to fast movement. Cars for certain territories or destinations are grouped together and placed in designated trains, which permits of such subsequent separation as may be required with the least number of switch movements.

The movements of these trains are reported by telegraph to a central office, where they are recorded in such a manner as to indicate immediately whether a train has dropped behind its schedule for any reason. When this occurs, the matter is immediately called to the attention of the officers in charge, who take the necessary steps to overcome the cause for the loss of time and make the necessary arrangements for its recovery.



The Freight Transfer at Cheyenne, Wyo., Where Merchandise Is Promptly Handled

Possibility of delay is minimized by giving rolling equipment special attention to insure an uninterrupted trip over the line, but, regardless of the utmost care, some defect in equipment will occasionally develop en-route, which requires replacement or repairs. When a case of this kind does occur, the repairs are made while the car is in the train, if at all possible. If this cannot be done, the car is taken out of the train and to the repair yard, where it is given immediate attention and returned to the same train, if the work involved is not too extensive. Otherwise, it is placed in the first following train after being made ready.

#### The Perishable Movement

A considerable portion of the eastbound freight traffic moving over the Union Pacific consists of perishable freight originating in California, Oregon, Washington, and the Intermountain states. With respect to the different commodities this traffic is divided approximately as follows:

	Per Cent
Apples .....	10
Citrus Fruit .....	9
Grapes .....	25
Lettuce .....	7
Potatoes .....	17
Vegetables and miscellaneous fruit .....	32
Total .....	100

Refrigerator cars are required for practically all of this traffic. The loaded cars are moved into concentration points where they are made up into fruit blocks for through movement to eastern destination. The designated concentration points and the territories they serve are:

Colton, Cal., on the L. A. & S. L. for Southern California territory.

Roseville on the Southern Pacific and Sacramento on the Western Pacific for Central and Northern California territory.

Rieth, Ore., on the O.-W. R. R. & N. for Washington and Oregon territory.

Nampa, Idaho, and Pocatello, for Intermountain territory.

Each fruit block, as it leaves the concentration point, is given a symbol number by which it is identified through to destination.

During the summer season, when refrigeration is necessary to insure the lading arriving at destination in proper condition, the cars are given initial icing just before or at the time of loading, and they are re-iced en-

route at points where icing plants equipped with up-to-date facilities are maintained, thus permitting the re-icing to be accomplished without delay. The loading docks at these icing stations are of sufficient capacity to permit the icing of an entire train without the necessity of switching.

The hour of arrival of fruit blocks at the final destinations is fixed under the through schedules, and was developed with a view to permitting the commodity involved being placed on the market under the most favorable conditions.

Owing to the variety of perishable commodities, fruit blocks are not a seasonal but an all-year-round movement, although a peak movement is reached in September at the same time that the movement of almost all other classes of freight is the heaviest.

#### Handling Manifest Freight

Manifest freight is so identified in telegraphic passing reports that the exact location of any particular car in its movement over the Union Pacific is always known. These reports are telegraphed to certain officers located at strategic points where current records are maintained, and this "intelligence service" is available for the benefit of shippers, consignees, railroad representatives and, in fact, any one who might be interested therein.

Each train handling this traffic is given a letter-number symbol by which it is identified in its movement over Union Pacific lines, similar to the manner in which perishable freight trains already described herein are identified.

This fast freight service is not confined entirely to carload shipments, but includes less-than-car-load traffic handled in scheduled merchandise cars which move regularly on designated days, regardless of the amount of freight they contain. Under this plan the shipper of small consignments of freight is given the same fast, dependable service that is provided for carload shipments.

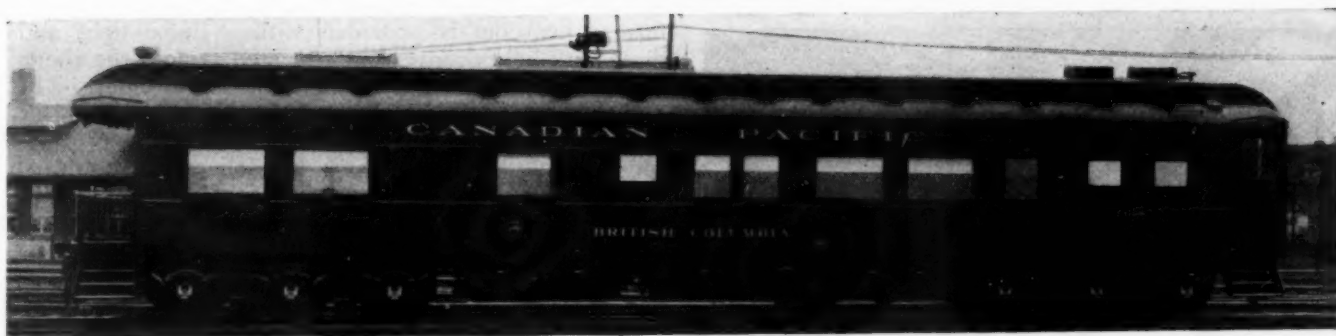
In order to provide this service, the Union Pacific has expended millions of dollars in the purchase of latest and most powerful type of locomotives, and modern refrigeration facilities, and for improvements in yard facilities, roadway trackage, etc., and currently incurs much expense in maintaining these facilities in such a manner as to insure that the service will carry on under all circumstances.

\* \* \*



A New York Central Westbound Passenger Train at Grand Crossing, Chicago, Ill., Pennsylvania Tracks to the Right, Illinois Central Beneath





Type of Business Car to be Furnished all Canadian Pacific General Superintendents

# Canadian Pacific Business Cars for General Superintendents

*Interior arranged to furnish maximum comfort and convenience—Sleeping accommodations available for eight passengers*

THE completion of three business cars at the Angus shops (Montreal) of the Canadian Pacific, is the beginning of a program to furnish each general superintendent with a new private car. The cars will be named after the district over which the general superintendent has supervision. Thus, the three cars recently placed in service have been named the British Columbia, the Ontario and the Algoma.

## The Car Structure

The underframe consists of side sills and a built-up center sill with a top cover plate. Numerous transverse stiffeners tie the whole together into a rigidly constructed underframe, the top surface of which is entirely covered with a 1-16-in. cover plate. The cars are furnished with Commonwealth end platform castings and Miner A5X draft gears.

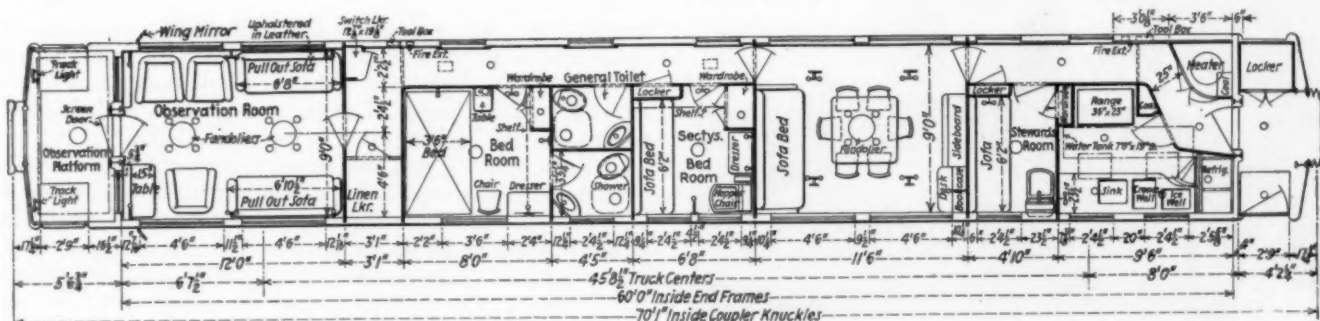
The clere-story roof has an unusually wide deck. The usual type of pressed carlines have been replaced by built-up carlines, which consist of two 2-in. by 2-in. by 3-16-in. angles between which is placed a 2-in. by 5-16-in. filler and the whole riveted together. Wood furings are bolted on the angles. Stiffeners 1/8-in. in thickness are used to cross-brace the roof to prevent creaking. The roof is wood sheathed and covered with canvas.

All of the side sheets, angles, etc., are made of copper-bearing steel. An unusual feature of the body construction is a modified design of belt rail in the form of a drip moulding, which is located above the windows on each side of the car.

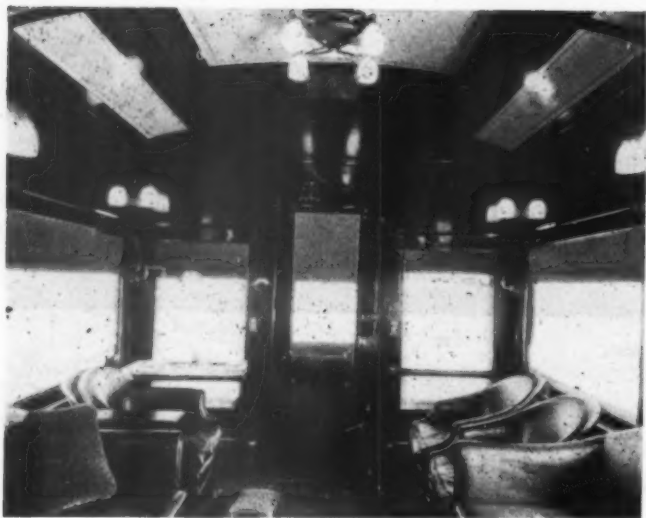
The inside of the car next to the side sheets is lined with five-ply insulating material below the belt rail, and with three-ply material above the belt rail. This is covered with built-up mahogany veneer, which is given a highly polished finish. The ceiling is covered with cream-colored Sundeala board, upon which is stencilled a narrow buff border line. Pressed prism glass is used in the toilet windows. The cars are fitted with storm windows and wood sash are used throughout.

The heating system is unusual in that additional heating pipes in each room, which can be controlled by the occupant, lead off from the main two-pipe circuit. Additional heating surface in the form of Heal finned pipe is furnished in the observation room beneath the two end windows. The system can be heated either with steam from the locomotive, or by a coal-fired heater located in the passage at the kitchen end of the car.

Since a car of this type requires plenty of hot and cold water, it was necessary to provide ample water-storage tanks. Five overhead storage tanks with a total capacity of 150 gal. of water are provided, to supply hot and cold water to the two toilet rooms, one of



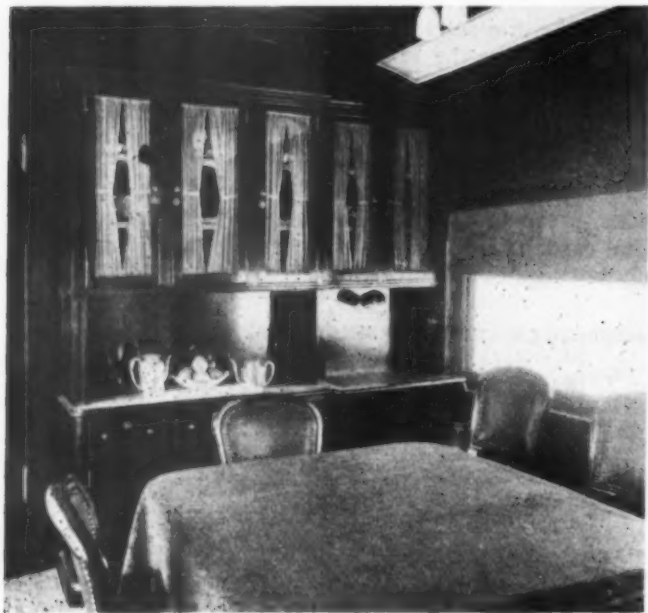
Floor Plan of Canadian Pacific General Superintendent's Car



The Observation End of the Car

which contains a shower bath. A 60-gal. water tank is located beneath the car. Thus, the washbowls, shower and toilet can be supplied with water either by gravity from the overhead tanks or by air pressure from the storage tank under the car. The system is controlled by a valve, which can be reached either from the outside or through a trap door located in the passageway along one side of the car. Hot water is supplied either from a 15-gal. tank in the kitchen, which is heated by a Pintch gas heater, or from the kitchen range, which is equipped with a hot-water heater. The 80-gal. overhead kitchen tank, which feeds by gravity only, can be filled from the main tank beneath the car. With this system, an ample supply of hot water is always available and if any of the overhead tanks become empty, they can be pressure filled from the main storage tank.

Current is supplied to the car-lighting system by a 30-volt 3-kw. generator and by storage batteries when the car is not in a train. In addition to two Fandoliers, each with four pendants, in the observation room, five wall lights are located along each side of the room. The



A Corner in the Dining Room

master bedroom is provided with a dome light and three wall lights conveniently located around the room. Each toilet contains a dome light and a wall light. The dining room has a Fandolier located directly over the table and two pairs of wall lights on each side of the room. The rooms in which Fandoliers are not used are each fitted with a 12-in. wall fan. The kitchen is ventilated by two Mudge roof ventilators in addition to a wall fan.

#### Inside Arrangement

The observation room is furnished with three large arm chairs and two large sofas which may be turned into beds; all are upholstered in black leather. All of the car floor, except the bathrooms and the kitchen, is covered with a blue-and-tan carpet. The observation room is also furnished with a drop table and the customary recording instruments.

From the front of the observation room a corridor runs along one side of the car, from which doors lead into the master bedroom, the general toilet, the secretary's room and the steward's room. The dining room extends entirely across the car and is separated from the corridor by a swinging door on each end.

The master bedroom is fitted with a 3-ft. 6-in. bed, a night table at the

head of the bed, a dresser, a wardrobe, an upholstered chair and a private bathroom in which is a curtained shower. This bathroom has a tiled floor and tiled walls 3 ft. 2 in. high. The general toilet, which is next to the private bathroom, also has a tiled floor.

The secretary's and the steward's room each contain a leather upholstered sofa, a folding wash basin and a hopper. In the secretary's room the back of the sofa is used to form an upper berth. The secretary's room also contains a dresser and a wardrobe. An extension wall light is provided under which a table may be set up for the secretary's use.

The dining room contains an extension table, around



White Tiled Bathroom Attached to the Master Bedroom



which are placed six leather upholstered dining chairs. This room also contains a leather upholstered sofa, the back of which can be used to form an upper berth. Alongside of the usual sideboard is located a writing desk, above which is a built-in bookcase.

The kitchen contains a coal range supplied with a gas plate using Pintch gas. The coal boxes and the refrigerator are filled from the roof. All flat surfaces, including the table tops, trays and inside of the refrigerator are covered with Monel metal.

### The Trucks

The cars are furnished with Commonwealth six-wheel trucks fitted with clasp brakes on all wheels. The truck frame has been well re-inforced with heavy ribs to give balance and a pleasing appearance. Straight equalizers have been used, instead of the curved type, for the purpose of facilitating inspection and the application of brakeshoes. The side bearings have been placed inside instead of outside of the frame and the pedestal columns have been designed for the future application of roller bearings. At the present time, a 3-in. filler block has been placed on the face of each pedestal column for the application of the conventional type of A. R. A. journal bearing. The outer surfaces of the truck frames have been ground to a smooth surface and then painted to a smooth glossy finish. The purpose of this unusual treatment is to provide a finish of pleasing appearance which will be easy to clean. At the rear end of the car a track light is located directly below each platform trap door.

The car measures 70 ft. 1 in. inside of the coupler knuckles and 45 ft. 8½ in. between truck centers. It is 9 ft. wide between posts.

## Accident Investigations; Last Quarter of 1928

THE Interstate Commerce Commission has issued No. 38 of its regular quarterly summaries of investigations of train accidents, which is for the months of October, November and December, 1928. This bulletin contains abstracts of the reports which have been made on 22 train accidents—16 collisions and

### Train Accidents Investigated, Quarter Ending December, 1928

1407.	A. T. & S. F.	Yampai, Ariz.	Mar. 13	D
1444.	Yazoo & Miss. Valley	Gowdey, Miss.	Sept. 22	D
1445.	New York Cent. and C.R.I.&P.	Chicago, Ill.	Oct. 13	C
1446.	Union Tract Co. of Ind.	Sharpsville, Ind.	Oct. 21	C
1447.	Chicago & North Western	Crookston, Nebr.	Oct. 22	C
1448.	Missouri Pacific	Knoxville, Ark.	Oct. 23	C
1449.	Union Pacific	Green River, Wyo.	Oct. 24	C
1450.	Ogden Union Ry. & Depot Co.	Ogden, Utah	Nov. 1	C
1452.	C. R. I. & P.	Chicago, Ill.	Nov. 3	C
1453.	Illinois Central	Centralia, Ill.	Nov. 7	D
1454.	Gulf, Colorado & Santa Fe	Texas City Jct., Tex.	Nov. 7	C
1455.	Atlantic Coast Line	Aulander, N. C.	Nov. 7	D
1456.	Louisville & Nashville	Leewood, Tenn.	Nov. 11	C
1457.	Norfolk & Western	Fries Jct., Va.	Nov. 16	C
1458.	Boston & Maine	Lowell, Mass.	Nov. 19	C
1460.	C. R. I. & P.	Enterprise, Iowa	Dec. 1	C
1461.	Chicago & Western Indiana	Chicago, Ill.	Dec. 6	D
1462.	Fort Worth & Denver City	Twixt, Tex.	Dec. 9	C
1463.	Missouri Pacific	LaRussell, Mo.	Dec. 13	C
1464.	Baltimore & Ohio	Martin, Ind.	Dec. 21	C
1465.	Yazoo & Miss. Valley	Howard, Miss.	Dec. 22	C
1466.	Int'l. Great Northern	Neches, Tex.	Dec. 23	D

six derailments. The first one of these abstracts is No. 1407, Yampai, Ariz., March 13, 1928, which is given below, condensed. The next one, No. 1444, Gowdey, Miss., September 22, was noticed in the *Railway Age* of May 18, last.

The next five, which occurred in October, were reported March 9, last, page 587. The next eight, occurring in November, appeared in the issue of April 6, page 799. The last seven occurring in December, appeared in the *Railway Age* of July 6, page 26.

In addition to the foregoing, there are noted below, a derailment due to a broken rail (No. 1431) and another due to a broken wheel (No. 1459) the reports of which have not yet appeared in any bulletin. These two reports were delayed because of the long time taken in making examinations of the rail and wheel which failed.

*Atchison, Topeka & Santa Fe*, Yampai, Ariz., March 13, 1928.—Eastbound passenger train No. 10, moving at between 20 and 30 miles an hour, was derailed by a broken rail and one mail clerk and two employees were killed and 27 passengers, 2 mail clerks and 2 employees were injured. Inspection of the tracks disclosed six of the outside rails broken on a curve of 8 degrees, 10 minutes, on which the derailment occurred. The report calls attention to the fact that the primitive portion of the fracture which apparently caused the derailment was close to the end of the rail and was covered by splice bars; and because of the bond wires, the breakage did not open or weaken the track circuit. A report of the investigation of the rail, profusely illustrated, has been issued by the Commission.

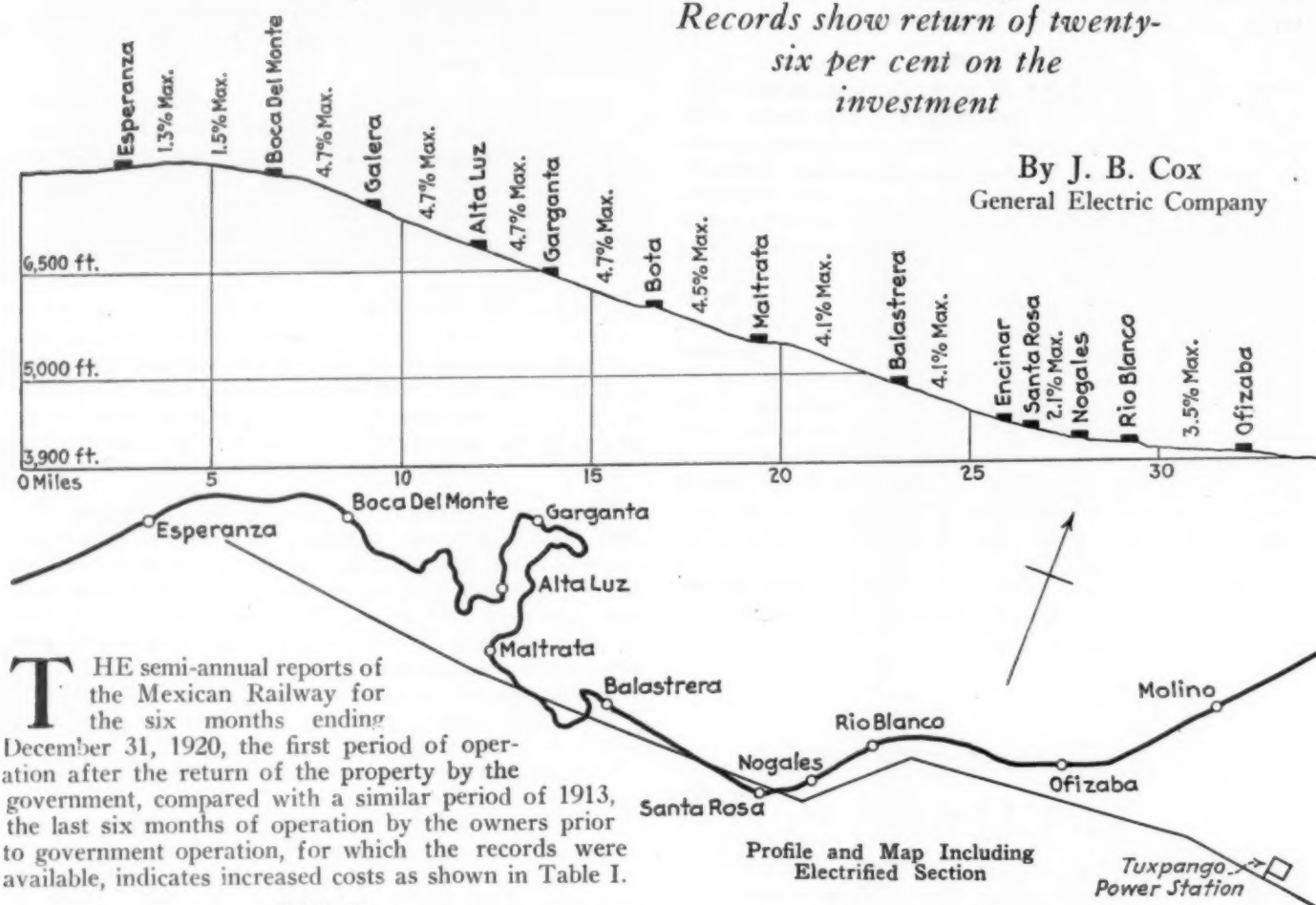
*Southern*, Shannon, Ga., July 18, 1928. (Report No. 1431).—Northbound passenger train No. 2 consisting of locomotive No. 1405 and 12 cars, was derailed by a broken rail while moving at about 50 miles an hour and one passenger was killed; 21 passengers and two employees injured. The rail which broke and caused this derailment was examined by J. E. Howard, engineer-physicist, whose conclusions are quoted in the report. There were four transverse fissures, one bad one, seven feet from the receiving end, having been evidently the cause of the failure of the rail. Speculating on the reasons for difference in the sizes or other characteristics of the different fissures, Mr. Howard believes that the differences are due to different conditions of exposure rather than to primitive variations in strength along different parts of the rail. There is probably a relation between the ages of transverse fissures and their sizes in the same rail. This example is not different from many others which have been found, but it is held to be disquieting because the rail had been in service only one year and eight months. This fact suggests the need of further investigation.

*Baltimore & Ohio*, Engle, W. Va., November 25, 1928, 8:19 p.m. Report No. 1459.—An eastbound freight train of 99 cars and a caboose, drawn by locomotive No. 6166, was derailed by a broken wheel, and 12 or more cars fell across the westbound track; and westbound passenger train No. 1 moving at about 50 miles an hour, ran into the wreckage. The passenger locomotive was overturned and the engineer and fireman were killed; four passengers, two Pullman employees and 15 railroad employees were injured. The report contains an essay by James E. Howard, engineer-physicist, on the cause of the failure of the wheel. He names no specific cause for the fractures found in this case, but expresses the belief that the wheel was exposed to service conditions which had a tendency to culminate in rupture. Laboratory examinations of fractured material do not throw much light on such cases, and, says the report, there is need of more definite information about conditions of service.

# Performance of the Mexican Railway Electrification\*

Records show return of twenty-six per cent on the investment

By J. B. Cox  
General Electric Company



THE semi-annual reports of the Mexican Railway for the six months ending December 31, 1920, the first period of operation after the return of the property by the government, compared with a similar period of 1913, the last six months of operation by the owners prior to government operation, for which the records were available, indicates increased costs as shown in Table I.

Table I

	1913	1920	Increase Amount	Ratio
Maint. of way and structures	\$195,755	\$379,652	\$183,897	1.94
Maintenance of equipment	245,607	625,256	389,650	2.65
Conducting transportation	720,148	1,563,682	843,485	2.17
General expense	105,120	199,760	94,640	1.90
Total operating expenses	\$1,256,630	\$2,768,350	\$1,511,672	2.20
Gross receipts	2,484,018	3,504,847	1,020,829	1.41
Net receipts	1,227,388	736,497	490,891	.61
Operating ratio	.51	.79		

The comparative costs of the items that would be most directly affected by electrification for the above period are shown in Table II.

Table II

	1913	1920	Increase Amount	Ratio
Repairs to locomotives	\$88,875	\$280,463	\$191,588	3.15
Enginemen and roundhouse	72,931	236,673	163,742	3.24
Fuel for locomotives	244,202	359,071	114,869	1.45
Train service	80,295	200,008	119,713	2.49
Total	\$486,303	\$1,076,215	\$589,912	2.21

An analysis of the above comparative cost indicated that the motive power in use on the system should receive careful consideration.

The management of the railway suggested that the months of September and October, 1921, should be taken as a basis for the study, since the traffic conditions and operating costs during that period were more rep-

resentative of anticipated future conditions than any other period for which records were available.

The mountain district constituting the line between Orizaba and Esperanza, a distance of 29.5 mi., was then operated as a separate district and accurate operating expenses and statistics for steam operation were readily available for comparison with corresponding estimated costs of electrical operation.

The line between Orizaba and Paso del Macho was also included in the original study but since this was operated with the remainder of the line on into Vera Cruz, and the result of electrification could not be so definitely determined until an exact schedule of operation had been decided upon, only an approximate estimate was made for this section.

Of the 29.5 mi. between Orizaba and Esperanza, the 19 mi. between Encinar and Boca del Monte, which had been given careful consideration in the original survey, again became the determining factor relative to motive power. The actual rise in the 19 mi. is approximately 3500 ft., equal to an uncompensated grade of 3.5 per cent. With the exception of the first 2.5 mi. of this heavy grade just out of Encinar there is practically no tangent track, but continuously reversing curves, many of which are on a radius of 351 ft., equivalent to 16.5 deg.

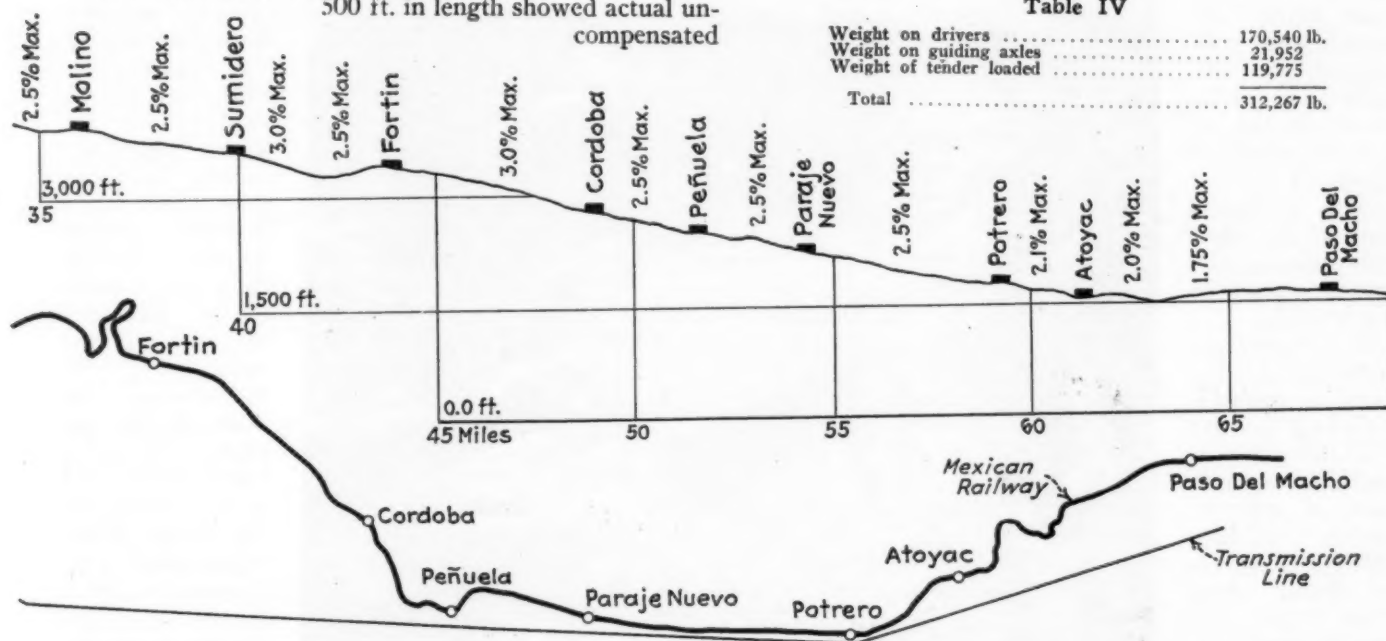
\* Abstract of a paper presented at the Summer Convention of the American Institute of Electrical Engineers, Swampscott, Mass., June 25.



In locating the line, it was apparently intended to keep the uncompensated grade at a maximum not to exceed 4 per cent and the maximum curve at 16.5 deg. During the study, it was learned that some new consolidation type locomotives that had been recently purchased and were temporarily being used on this division had failed to handle satisfactorily the weight of train they had been calculated to handle on the heavy grade.

These locomotives were expected to be capable of taking a trailing load of 250 tons up the mountain grade. In practice, it was found that it was not practicable for them to take more than 175 tons, which represents a coefficient of adhesion of approximately 20 per cent on a grade of 4.7 per cent. Since the profile did not indicate a grade in excess of 4 per cent, or curvature greater than 16.5 deg. at any point, an investigation was made which indicated that there were certain points on the line where the engines stalled from the slipping of drivers and, as there was no indication that the condition of the rails at this point was responsible an engineer was sent to check the grade.

It was found that short sections of track from 300 to 500 ft. in length showed actual uncompensated



grades as high as 4.4 per cent which when properly compensated for curvature would make the maximum grade 5.24 per cent. The average uncompensated grade for the 1.24 mi., which represented the section of greatest difficulty, was found to be 3.95 per cent, which when compensated for 16.5 deg. curvature at the rate of 0.90 lb. per deg. is equivalent to a grade of 4.7 per cent. Accordingly, this was taken to be the ruling grade for the division in the specifications for electric motive power.

The average weight of the passenger trains over the road was 215 tons, but these trains varied from 165 to 350 tons.

The steam locomotives that had generally been used for handling both freight and passenger trains on this division consisted of 34 four-cylinder Fairlie locomotives, of English build. These locomotives were designed especially for mountain service, having pack-saddle type tanks for fuel oil and water over a double-ended boiler which was mounted on two 3-axle swivel trucks, all the weight being on the drivers.

The locomotives had the appearance of two 3-axle switching locomotives coupled with cab ends together.

The fire-box was in the middle and contained two oil burners, the cab being over this central portion and the engineman located on one side of the boiler with the fireman on the opposite side. The locomotives ran equally well in either direction, and having a comparatively short rigid wheel base with all weight on the drivers at once deprived the electric locomotive of its usually boasted advantages.

The 32 locomotives were all of the same general type but of variable ages and weights as shown in Table III.

Table III

5 weighing, with full tanks	167,428 lb.
12 weighing, with full tanks	216,540
10 weighing, with full tanks	221,000
2 weighing, with full tanks	267,885
3 weighing, with full tanks	305,835

The first five of the above locomotives were not being used at the time, as ten new locomotives of the consolidation type had just been received and some of these were being substituted temporarily.

The weight of these new locomotives was as shown in Table IV.

Table IV

Weight on drivers	170,540 lb.
Weight on guiding axles	21,952
Weight of tender loaded	119,775
Total	312,267 lb.

During the months of September and October, 1921, there had been taken over the division a total of 474 trains south bound, with an aggregate tonnage of 108,749 gross metric tons, and 622 trains with aggregate gross metric tonnage of 197,220 north bound. The total hours of elapsed time, or the hours for which the engine and train crews were paid between Orizaba and Boca del Monte where the helper locomotives on the freight trains were usually left off, were 1574 for the south bound and 2756 for the north bound traffic.

This represented an average schedule speed of 7.66 m.p.h. and 5.7 m.p.h. respectively for the south bound and north bound trains, and an average delay of 47.4 min. per train or 25 per cent of the running time per train.

Practically all freight trains, and most of the passenger trains, required two locomotives. In the case of the passenger trains, both Fairlie locomotives were placed at the head of the train with a box-car between and with the freight trains a locomotive was placed at each end.

The average weight of the trains up grade was 317 metric tons or 350 U. S. tons. The down-grade tons

were considerably less, as almost two-thirds of the traffic was northbound.

The average wage of the enginemen and trainmen on the Mexican Railway at the time was approximately as shown in Table V, based on an 8-hour day or 100 miles.

Table V

	Pesos per day	Dollars per day
Enginemen .....	12.00	\$6.00
Firemen .....	6.00	3.00
Conductors .....	11.00	5.50
Brakemen .....	5.28	2.69

The operating data and actual costs of the steam operation for the months of September and October 1921, were taken as a basis for estimating the saving that might be expected to result from the electrification of the Orizaba - Esperanza district.

Only the items of operating costs which would be most vitally affected were considered. The estimate as submitted in the report is shown in Table VI.

The estimated cost of the electrification as submitted is given in Table VII.

The report accordingly indicated a probable saving of \$523,029 per year by the expenditure of approximately \$2,420,000, or a return of slightly more than 21 per cent on the gross investment which included electric locomotives.

A similar study of the line between Orizaba and Paso del Macho was made at the same time, but as the savings that seemed probable were sufficient for a return only about half that of the Orizaba-Esperanza district, the report recommended that only the latter be undertaken in the beginning.

Table VI

	Steam	Electric	Saving	Ratio steam to electric
Wages of enginemen .....	\$108,892	\$31,354	\$76,538	3.44
Wages of trainmen .....	85,290	23,191	62,099	3.68
Fuel and power .....	221,790	150,000	71,790	1.48
Repairs to locomotives .....	355,248	51,111	304,157	6.95
Enginehouse expense .....	20,946	5,841	15,105	3.57
Lubricants .....	16,656	2,921	13,735	5.70
Substation oper. and maint. ....		11,750		
Maint. distributing system .....		9,625		
Total .....	\$808,822	\$285,793	\$523,029	2.82

After a very careful examination of the report by the operating department of the railway, it was approved and recommended to the board of directors.

Table VII

10 150-ton electric locomotive units .....	\$1,420,000
1 6000-kw. substation .....	350,000
30 Route miles distributing system .....	430,000
Engineering and contingencies .....	220,000
Total gross capital investment .....	\$2,420,000

In October, 1922, a contract was made for the required equipment and materials including the general supervision of the installation.

Actual work on the ground was begun in January 1923, and the work was completed and all trains were being hauled electrically by January, 1925.

Just when the construction work had been fully organized and got well under way it was almost entirely stopped from the middle of December, 1923, to May, 1924, by the rebellion which occurred at that time. This interruption caused several months delay and considerably increased the cost of the work.

The work was done almost entirely with native labor which had to be trained for the work. Three supervising engineers were placed in direct charge of the distribution, the substation and the locomotives respectively, reporting to the resident engineer of the railway company, in co-operation with the general engineer

who was in charge of the work for the contracting company.

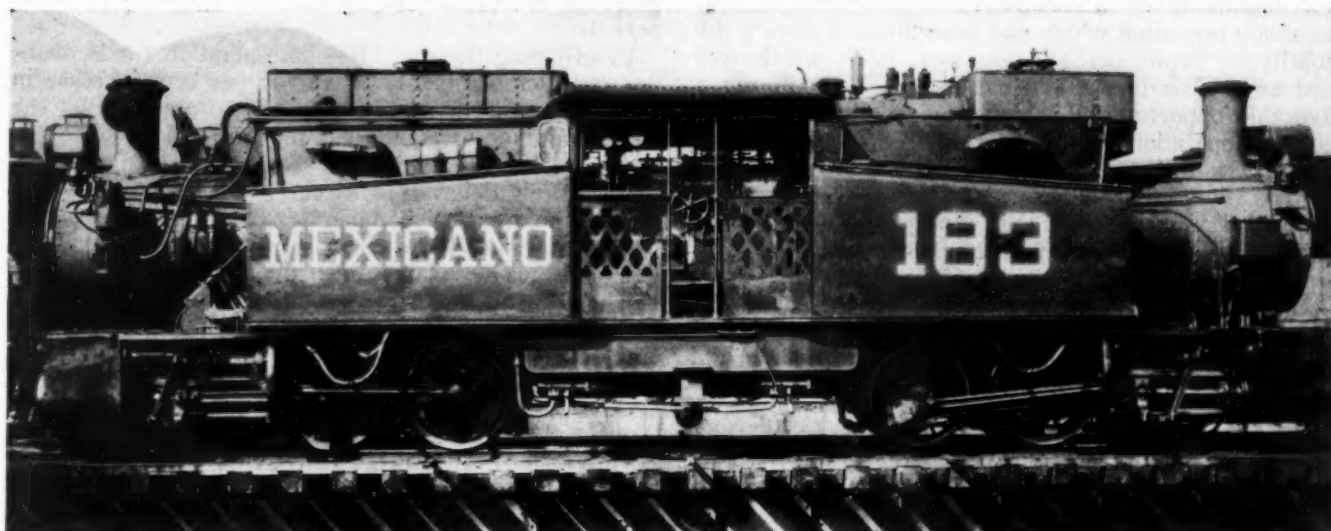
The initial motive power equipment for the Orizaba-Esperanza section included ten locomotive units suitable for handling both passenger and freight service. These locomotives are of the twin-gear six-motor articulated-truck type capable of operating at a maximum speed of 40 mi. per hr. and provided with equipment for regenerative electric braking.

With the extension of the electrification from Orizaba to Paso del Macho additional motive power was required and for this purpose two locomotives, duplicates of the original design, have recently been delivered.



The Bota Loop Section, Showing Town of Maltrata—Orizaba Peak in Background





Firley, 150-Ton Locomotive Formerly Used in Zone Now Electrified

Electrical and mechanical data on these locomotives are shown in Table VIII.

Table VIII

#### DATA ON ELECTRIC LOCOMOTIVES ELECTRICAL DATA

Nominal voltage of system	3000-volt d-c.
Tractive eff., 1 hr. blown (3000-volt)	54,000 lb.
Speed at 1 hr. rating, full field	19 m. p. h.
Total horsepower, 1 hr.	2736
Tractive eff., con. 3000-volt full field	48,500
Speed at continuous rating, 300-volt	19.5 m.p.h.
Total horsepower, continuous	2520
Number of motors	6
Type of motors	GE-278-A-1500/3000 volts
Gear ratio	90/18.5:00
Tractive eff. at 30 per cent tract. coef.	92,700 lb.

#### MECHANICAL DATA

Track gage	4 ft. 8½ in.
Wheel arrangement	04440
Diameter of drivers	46 in.
Number of driving axles	6
Total wheel base	40 ft. 6 in.
Max. rigid wheel base	9 ft. 2 in.
Width overall	10 ft. 1½ in.
Height over trolley locked down	15 ft. 2 in.
Length inside knuckles	52 ft. 11 in.

#### WEIGHTS

Total weight on drivers	309,000 lb.
Dead weight per axle	12,150 lb.
Elec. and air brake equipment	135,000 lb.
Mechanical equipment	174,000 lb.

The Orizaba-Esperanza section has now been in complete operation electrically since January, 1925,

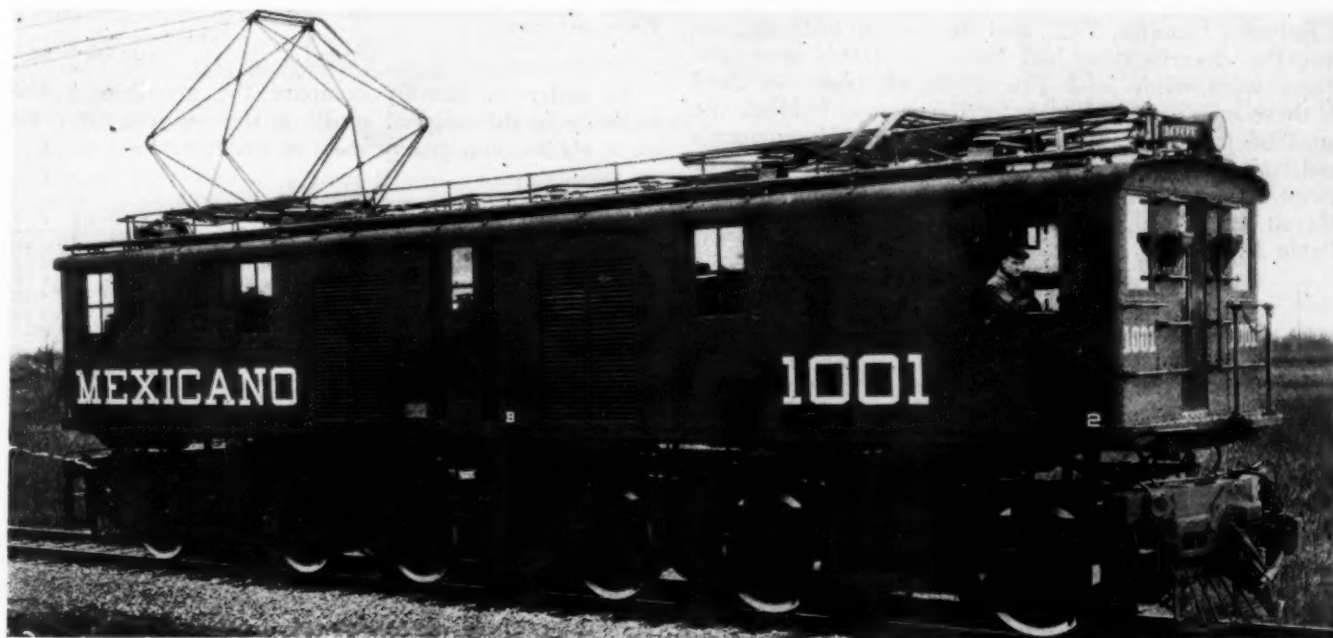
thus making the records for four full years of operating data and costs available.

The great reduction in business resulting from the unsettled conditions caused by the disturbances in 1924 as well as new labor agreements and increased wages had tended to make direct comparisons of operating costs look less favorable than they really were. A decrease in the tonnage to be hauled reduces operating costs to an extent but unfortunately, not nearly in the same proportion and the capital charges remain practically the same. On the other hand increased wages and higher costs of fuel and materials usually tend to make electrification comparatively more profitable.

The operation has been very satisfactory and successful throughout. No serious difficulties have been encountered with any portion of the equipment. This may be measured fairly by reference to the complaint bill for the usual guarantee period which was less than \$3,000.

The general performance of the equipment may best be judged by the costs of maintenance, a fair average of which is given herein.

During the months of March and April, 1928, the traffic over the Orizaba-Esperanza section reached a



One of the Electric Locomotives

new maximum which was somewhat in excess of that for steam operation which had been attained during the months of September and October, 1921, which was used as a basis in the original study. This offered a favorable opportunity for comparing actual results of electrical operation with that for steam operation, as well as to check the estimates in the report leading to the electrification.

Detailed tabulations of the operating records for March and April, 1928, with electrical operation were prepared for comparison with similar records as used in the report for September and October, 1921, with steam operation.

A summary of this comparison is given in Table IX.

Table IX

	1921 Steam oper. Sept. & Oct.	1928 Elec. oper. Mar. & Apr.	Difference Amount	Per cent of steam
Number of trains run	1,096	1,011	85	108
Number of cars handled	9,238	12,840	3,602	139
Number of tons handled	305,969	416,037	110,068	136
Number of train hours	4,577	2,718	1,859	60
Number of tons per train	279	412	133	148
Number of cars per train	8.43	12.70	4.27	150
Number of hours per train	4.18	2.69	1.49	64
Cost enginemen's wages	\$17,982	\$14,565	\$3,417	81
Cost trainmen's wages	14,222	10,721	3,501	76
Cost fuel oil or power	36,965	31,140	5,825	84
Cost locomotive repairs	59,208	5,969	53,239	10
Enginehouse expense	3,391	1,945	1,446	58
Lubricants	2,776	92	2,684	3
Substation operation		2,154	2,154	..
Trolley maintenance		856	856	..
Total cost items affected	\$134,544	\$67,442	\$67,102	50

Briefly stated, the 10 electric locomotives during March and April handled 36 per cent more tons than was handled by more than double the number of steam locomotives during September and October, with 8 per cent less trains and in 40 per cent less train hours on the road, and at 50 per cent of the corresponding total cost of steam operation for 26 per cent less tonnage handled; thus accomplishing a saving of \$67,102 for the two months, or at the rate of \$402,612 per year, which alone represents a return of more than 15 per cent on the gross cost of the electrification including electric locomotives. However, this amount does not represent actual saving, since the cost of all classes of labor had considerably increased during 1922 and 1923 so that it is necessary to adjust the costs of the steam operation to have them indicate what they would have been if the increased traffic of March and April had been handled by steam and at the higher rate of wages, as was done by the electric locomotives.

Between October, 1921, and the end of 1923 and before the electrification had been completed, new contracts were made with practically all labor involved in these operating costs, under the terms of which the rates of pay were materially increased. Enginemen's and trainmen's wages were increased on an average of about 42 per cent, which higher rates were in effect in March and April, 1928. The increases are given in Table X.

Table X

	1921	1928	Per cent
Enginemen per round trip	\$6.00	\$8.88	48.0
Firemen per round trip	2.88	4.44	54.1
Conductors per round trip	5.50	7.20	30.9
Brakemen per round trip	2.69	3.60	33.8

The wages of mechanics and others employed in the repair and care of locomotives were also proportionally increased but last year and the year previous thereto considerable reductions were made in this class of labor, to such an extent that no adjustment for wages in cost of repairs was considered necessary.

The average price paid for fuel oil during the months of September and October, 1921, was \$1.09 per barrel but the price paid for same in March and April is given

as \$1.29, an increase of 18 per cent over the previous periods.

In adjusting the cost of steam operation for September and October, 1921, for the 36 per cent increase in traffic, it was considered inaccurate to assume that the cost would increase in the same proportion, since the number of trains required to handle the traffic are almost entirely determined by the north bound or up-hill traffic which exceeded the south bound by 32 per cent during March and April. It is also possible to take considerably heavier trains down than up the mountain.

The adjustment for increased traffic was consequently made on the basis of the increased number of steam trains that would have been required to handle the north bound business.

The passenger trains run north in March and April numbered 122 as against 89 in September and October, an increase of 33 trains.

The freight tonnage hauled north for the same period was 195,357 and 175,625 respectively, an increase of 19,732 tons. At an average of 330 tons per train which is the exact record for the steam locomotives, 60 additional freight trains would have been required to handle this excess freight tonnage, making a total increase of 93 trains or 14.95 per cent. On an already congested single-track line with infrequent passing tracks, a 14.95 per cent increase in the number of trains would ordinarily considerably lengthen the time per train, and consequently increase the cost of wages and fuel, but since the enginemen and trainmen are paid by the trip if made in ordinary time, and the run being unusually short, no allowance was made for this item. It was considered conservative to assume that all other costs of the items listed would be increased in approximately the same proportion as the number of trains operated, that is, 14.95 per cent.

When the costs of steam operation were adjusted on this basis as outlined, the direct comparison between steam and electric operation for traffic handled in March and April, 1928, was shown in Table XI.

Table XI

	Steam Sept. & Oct.	Electric Mar. & April	Reduction Amount	Per cent
Enginemen	\$30,991	\$14,565	\$16,426	53
Trainmen	21,722	10,721	11,001	50
Fuel or power	50,139	31,140	18,999	38
Repair locomotives	68,059	5,969	62,090	91
Enginehouse expense	3,898	1,945	1,953	50
Lubricants	3,191	92	3,099	97
Substa. oper. maint.		2,154		..
Trolley oper. maint.		856		..
Total	\$178,000	\$67,442	\$110,558	62

In order to directly compare the above with the estimate in the original study on this subject the costs were placed on a yearly basis as follows:

Table XII

	Steam	Electric	Saving Indicated	Estimated
Enginemen	\$185,946	\$87,390	\$98,556	\$76,538
Trainmen	130,332	64,326	66,006	62,099
Fuel or power	300,834	186,840	113,994	71,790
Repairs to locos.	408,354	35,814	372,540	304,137
Enginehouse exp.	23,388	11,670	11,718	15,105
Lubricants	19,146	552	18,594	13,735
Substa. oper. maint.		12,924		..
Trolley oper. maint.		5,136		..
Total	\$1,068,000	\$404,652	\$663,348	\$523,029

The above indicated yearly saving of \$633,348 in favor of electrical operation is 27 per cent greater than the estimate, but this was readily accounted for by the 36 per cent greater tonnage handled since any material increase in traffic should increase the savings also, and in a greater proportion.

This annual saving represents approximately 26 per cent earning on the gross cost of the electrification of



the Orizaba-Esperanza district, which alone should be a very satisfactory result, but other more indirect savings which cannot be so accurately segregated, such as wear on wheels and brake shoes, reduction of accidents from broken wheels due to over-heating while braking would, if fully valued, add many hundreds of dollars to the credit of electrical operation.

Perhaps the most valuable unlisted asset in the electrification is the increased capacity of the lines electrified. On March 18, 5381 tons of freight and two passenger trains weighing 741 tons, making a total of 6122 tons, were hauled from Orizaba to Esperanza which was a record for the district. The record day with steam operation was October 25, 1921, when 4008 tons of freight and two passenger trains weighing 640 tons making a total of 4648 tons were handled; 1474 tons or 31 per cent in favor of the electric operation, 14 trains being used in each case.

The total tonnage handled electrically on March 18, north and south, was 9659 and that for October 25, 1921 by steam was 6532. The excess for electric operation was 50 per cent. The train hours electric were 64.6; steam 83.4, a reduction of 18.8 train hours or 22 per cent with an increased tonnage of 50 per cent.

By increasing the train weight to 900 tons (metric), for which the line and equipment are capable, it would be practicable to handle over the present line double the tonnage handled on March 18 with no additional facilities except for locomotives, cars, and power.

The ten locomotives now in service were expected to be sufficient to handle a maximum of 4200 tons or regularly 3600 tons in addition to two passenger trains per day in each direction between Orizaba and Esperanza.

This maximum was exceeded by 1181 tons or 28 per cent on March 18 and the average tons per day north bound for the month was 3350 tons but all ten locomotives were used on the maximum day.

The earnings on investment as shown are for the gross investment including the cost of electric locomotives. Had new steam locomotives been purchased these would have been charged as renewals or betterments and since sufficient new steam locomotives to handle an equal tonnage on a mountain district would cost approximately as much as the electric locomotives, it should be quite proper to deduct the cost of the locomotives from the cost of the electrification.

In the case of the Mexican Railway the cost of the electric locomotives was approximately 46 per cent of the gross cost of electrification and usually for heavy grade work this item will average between 40 and 50 per cent.

If the cost of the electric locomotives be deducted from the total cost of electrification the savings from electric operation as shown would be equivalent to an earning of 47 per cent on the net cost.

The entire 64 mi. has been in full operation for about a year, but the records are not yet available for a comparison such as is given for the original electrification and it will not be possible to have them so accurate as long as the 48 mi. on the Vera Cruz end is operated by steam.

The total cost of the 64 route-miles of electrification including electric locomotives was approximately \$3,606,937. The original study gave an estimate of \$4,032,500.

The experience gained from two years' operation in the Orizaba-Esperanza district made it evident that the traffic could be handled with a less number of locomotives than had been considered necessary, so that this item was reduced by approximately 20 per cent.

## Freight Car Loading

WASHINGTON, D. C.

**M**OVEMENT of freight in the first half of 1929 was the greatest for any corresponding period on record, according to reports compiled by the Car Service Division of the American Railway Association.

Loading of revenue freight for the first 26 weeks totaled 25,596,938 cars, which exceeded by 75,898 cars the best previous record for that period, made in 1927, and by 263,706 cars the total revenue freight loading for the first half of 1926. This also was an increase of 1,135,165 cars over the corresponding period in 1928.

For the week ended June 29, loading of revenue freight totaled 1,095,724 cars, the greatest number loaded in any one week so far this year and the peak week, so far as the first half of any year is concerned, for all time. Ordinarily this total for any one week has not been reached before the latter part of July or August. Compared with the corresponding week last year, the total for the week of June 29 was an increase of 92,025 cars and it was an increase of 74,286 over the corresponding week in 1927.

All districts reported increases in the total loading of all commodities compared with the same week in 1928, while all except the Southern reported increases compared with the same week in 1927, and all classes of commodities except livestock showed increases as compared with both years. The summary for the week of July 29 follows:

### Revenue Freight Car Loading

Week Ended Saturday, June 29, 1929

Districts	1929	1928	1927
Eastern .....	255,050	233,494	233,724
Allegheny .....	226,037	207,091	209,362
Pocahontas .....	61,207	53,171	56,025
Southern .....	139,787	138,398	148,641
Northwestern .....	174,839	157,554	160,317
Central Western .....	156,900	137,785	142,436
Southwestern .....	81,904	76,206	70,933
Total Western Districts .....	413,643	371,545	373,686
Total All Roads .....	1,095,724	1,003,699	1,021,438
Commodities			
Grain and Grain Products .....	51,946	36,797	44,249
Live Stock .....	22,967	24,213	26,256
Coal .....	165,664	146,289	144,823
Coke .....	12,070	9,705	9,985
Forest Products .....	69,457	66,809	67,590
Ore .....	76,657	68,335	66,404
Merchandise L. C. L. ....	260,617	258,899	260,545
Miscellaneous .....	436,346	392,652	401,586
June 29 .....	1,095,724	1,003,699	1,021,438
June 22 .....	1,069,046	987,360	1,018,060
June 15 .....	1,069,089	1,002,813	1,016,479
June 8 .....	1,054,792	995,570	1,028,367
June 1 .....	971,920	934,673	911,510
Cumulative total, 26 weeks .....	25,596,938	24,461,773	25,521,040

The freight car surplus for the week ended June 23 averaged 239,233 cars, a decrease of 9,968 cars as compared with the week before. This included 71,725 coal cars, 122,098 box cars, 25,500 stock cars and 13,628 refrigerator cars.

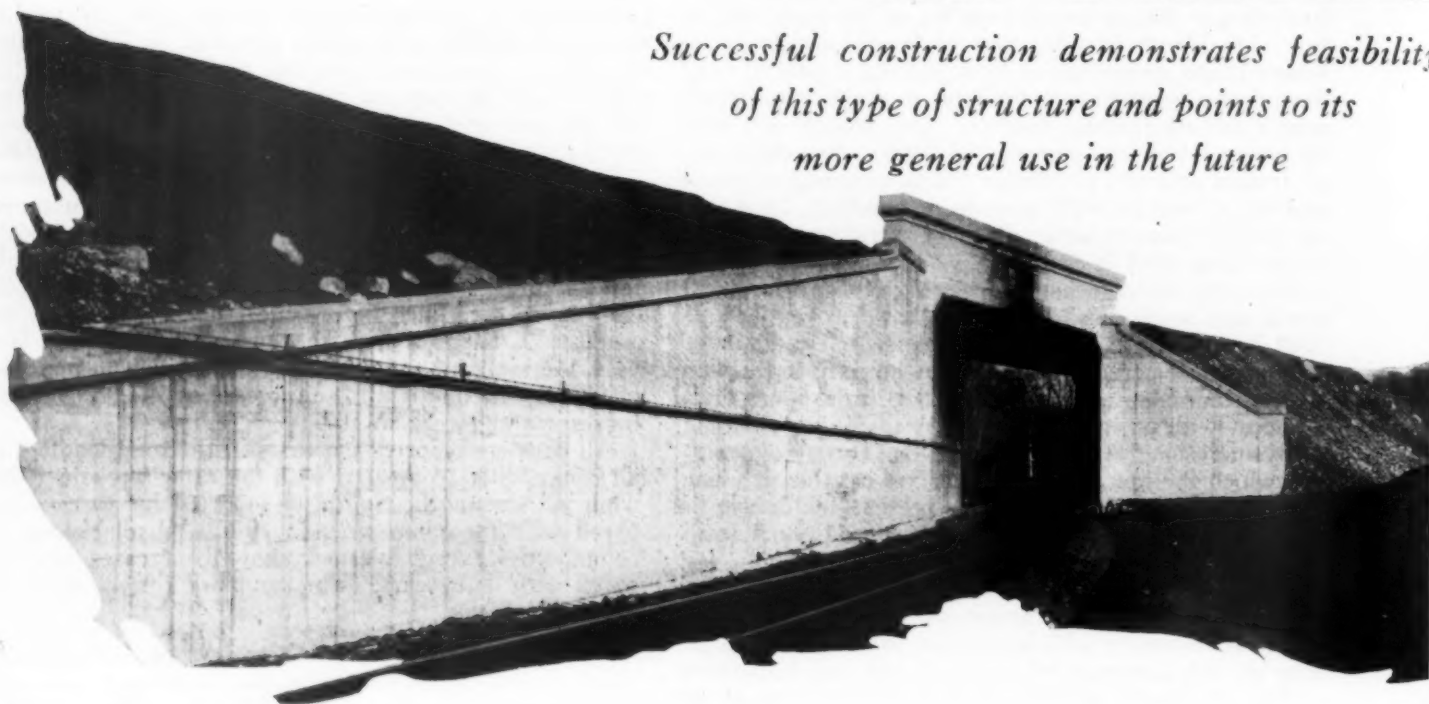
### Car Loading in Canada

Revenue car loadings at stations in Canada for the week ended June 29 totaled 74,250 cars, a decrease from the previous week of 1,104 cars and an increase over the same week last year of 5,452 cars.

	Total Cars Loaded	Total Cars Rec'd from Connections
Total for Canada		
June 29, 1929 .....	74,250	40,542
June 22, 1929 .....	75,354	39,905
June 15, 1929 .....	75,488	39,622
June 30, 1928 .....	68,798	37,209
Cumulative Totals for Canada		
June 29, 1929 .....	1,706,567	1,105,495
June 30, 1928 .....	1,663,898	1,024,150
July 2, 1927 .....	1,569,167	996,330

# Lackawanna Builds Two With Unusual

*Successful construction demonstrates feasibility of this type of structure and points to its more general use in the future*



*Looking Through the Undercrossing Near Denville*

**W**HAT are believed to be the two longest reinforced concrete girders carrying railroad loading in this country form essential features of two grade separation structures recently completed on the Delaware, Lackawanna & Western. In both cases the track loading is carried by a reinforced concrete slab, but in each, sharp skewers made it necessary to introduce fascia girders having clear spans in excess of 60 ft., the longest girder having an overall length of 71 ft. 3½ in. However, these structures are of interest not alone because of their unusual dimensions, but by reason of the many problems arising in their design. Aside from any special interest in these bridges themselves is the fact that they open up the question of the limit to which reinforced concrete can be used for this class of construction and point the way toward even greater span lengths through the use of higher-strength concrete, compressive reinforcement and lightweight aggregates.

These two structures form distinctive elements in extensive improvements made by the Lackawanna during the last 10 years and especially in the last five years in the New York suburban zone. Among other important features are the three-track lift-bridge over the Hackensack river, a new passenger station at Paterson, N. J., third and fourth tracking of 20.3 miles of line, and grade-crossing elimination work. In addition to this work, which has been completed, the Lackawanna is now undertaking the construction of an eight-story freight terminal and warehouse at Jersey City, N. J., and work is under way in connection with its program

for the electrification of 76 miles of line on its Morristown line and its branches, where its suburban traffic is the heaviest.

## **First Bridge Over Two Tracks of Erie**

The first of the two long-span concrete bridges to be built is located at Paterson Junction, N. J., on the Boonton line where the Lackawanna crosses the Greenwood Lake branch of the Erie. Before the improvement at this point, the existing structure, which was an open-deck steel-girder bridge, carried two tracks of the Lackawanna over a single track of the Erie. The new bridge, however, was designed to carry five tracks of the Lackawanna at 13-ft. centers on a span of sufficient clear opening to accommodate two tracks of the Erie.

The old structure at this point was supported on stone masonry abutments with stone wing walls, which, for the most part, were in excellent condition, but in the new work, concrete abutments were constructed upon and around the existing stone masonry, and the new concrete was extended beyond the lines of the old masonry and carried to a solid foundation six feet below the level of the Erie's track. The angle of crossing of the two roads at this bridge is 29 deg. 47 min., resulting in a skew of 60 deg. 13 min., and the old stone abutments, the faces of which were not exactly parallel, were about 29½ ft. apart, measured at right angles to their faces. Owing to the skew of the crossing, the new fascia girder span at the north parapet is 61 ft., and that at the south parapet is 59 ft. 6 in. The new fascia girder on the north side of the new bridge has an overall length



# Concrete Bridges Span Lengths

By M. Hirschthal

Concrete Engineer, Delaware, Lackawanna & Western,  
Hoboken, N. J.



*The Completed Crossing Over the Erie—In the Oval—The Old Structure with Temporary Trestle in the Foreground*

of 71 ft. 3½ in., while that on the south side has an overall length of 69 ft. 7 in.

## Compressive Reinforcement Used in Deck Slab

Because of the necessity for maintaining the existing minimum clearance of 18 ft. 9¼ in. above the top of rail of the Erie track, there remained available only 2 ft. 10 in. for the deck slab after allowing for the depth of the track, ballast and waterproofing. This necessitated the use of compressive reinforcement in the new concrete slab deck, to compensate for the 10 in. of additional thickness of slab which would otherwise have been provided for a slab of this span. The reinforcement of the slab for tension consists of 1¼-in. and 1-in. square bars spaced 4 in. center to center. All of the 1¼-in. bars are straight, whereas every other 1-in. bar is bent up over the supports at about the quarter points, which is sufficient to provide for diagonal tension. The compressive reinforcement consists of alternate 1¼-in. and 1-in. sq. bars spaced 5½-in. center to center.

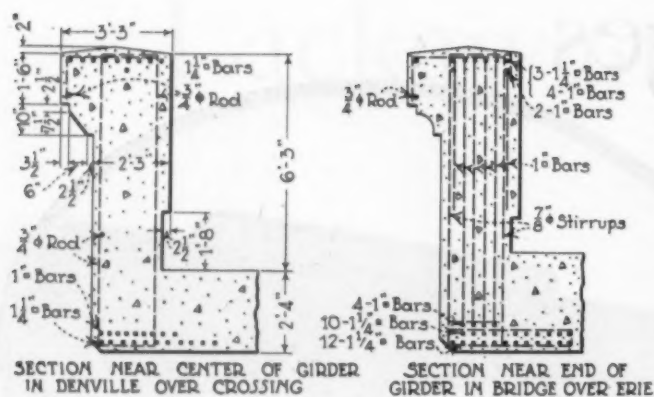
Both fascia girders, which were so located as to give a minimum side clearance of 8 ft. from the center lines of the outside tracks, were designed to support a triangular section of the track slab on which the area considered as subjected to live loading was determined on the assumption that the live load for the outside tracks was distributed over 13 ft. of width. This presented a rather complicated condition of loading for the design of the girders.

Because of the uncertainty of field conditions as to the span, and for the sake of duplication and simplicity, both fascia girders, despite their differences in span lengths (owing to the fact that the abutments are not

exactly parallel) were designed with identical cross sections and with the same areas of reinforcement. The total depth of these girders is 8 ft. 9 in., and they have a 2-ft. 3-in. stem thickness and a top flange width of 3 ft. 3 in. The tensile reinforcement, which was designed to resist a bending movement of over 60,000,000 in. lb., consists of twenty-two 1¼-in. straight square bars and six 1-in. square bars bent up to aid in taking the diagonal tension. In order to assist further in taking this stress, 7⁄8-in. round stirrups were added near the supports and ¾-in. round stirrups were added near the center of the span, these tending also to act as ties to the compressive reinforcement, which in these girders consisted of seventeen 1¼-in. square bars in two layers.

## Bridge Was Constructed in Two Sections

In order to facilitate the construction of the new bridge, a temporary track was built on falsework along the south side of the existing tracks, the falsework consisting of timber bents surmounted by heavy-section Bethlehem girder beams. This permitted the abandonment of the existing westbound track and the construction of the slab and girder on the north side. By the use of a construction joint along the inside edge of this slab, and the retention of that portion of the centering under the joint parallel with the Erie track until after the construction of the second section, it was possible to place two tracks in service on the first section of the bridge completed, before dismantling the old girder bridge or undertaking the completion of the new bridge. Originally it was planned to provide openings in the fascia girders with the idea of reducing their weight and



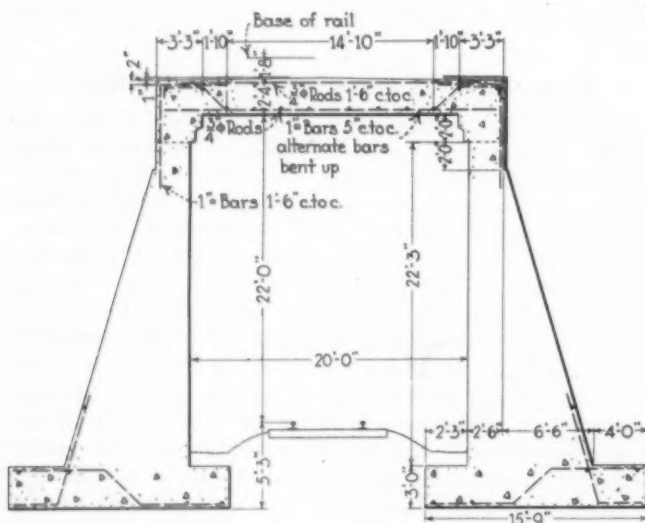
Typical Cross-sections of the Long Span Girders

to produce an architectural effect, but these were omitted at the instance of the field engineer for simplicity of construction. Drainage for the new bridge was provided by giving the deck slab a slope of 0.6 per cent westward, parallel with that of the track at this point. Waterproofing was effected by the application of two-ply asphalt-saturated membrane, protected by a course of 8-in. by 4-in. by 1/4-in. Hastings asphalt blocks.

#### Westbound Undercrossing Near Denville

The other long-span reinforced concrete bridge, which was built in connection with third and fourth tracking on the Boonton line, is located about one-half mile east of Denville, N. J. Of the four tracks on this line, the outside tracks are used for passenger service, while the two intermediate tracks are used for freight service. At Denville, however, where the Morristown line of the Lackawanna from the south joins the Boonton line, it was desired that both passenger tracks of the Boonton line be located on the south side of the freight tracks, so as to bring both of the passenger mains into direct connection with the Morristown line, which handles passenger business primarily. As a grade crossing of the westbound passenger main of the Boonton line with the freight tracks of that line was not advisable in view of the heavy passenger and freight traffic at this point, it was decided to extend the westbound passenger track under the freight tracks. This situation necessitated the undercrossing to be described.

As laid out, the westbound passenger track passes

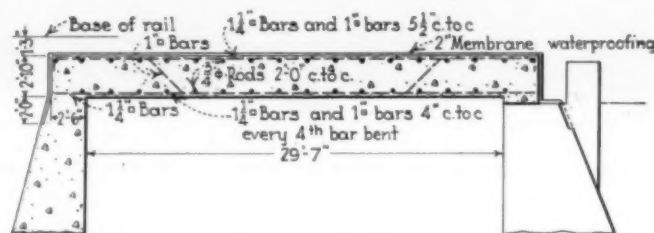


Cross-section of the Denville Undercrossing

under the freight tracks at an angle of 19 deg. and, allowing 10-ft. clearance on each side of this track, it was necessary to provide girder spans in the overhead bridge with a clear span of 58 ft. 6 in. The freight tracks over the bridge are spaced 13 ft. center to center and have a minimum side clearance of 8 ft. to the fascia girders. The maximum side clearance on the bridge is 9 ft. 3 in. at one corner, owing to the fact that the center line between the tracks and the center line of the bridge are not coincident.

The concrete floor slab of the bridge, which is reinforced at right angles to the abutments, is 2 ft. 4 in. thick, and is pitched one inch to each side for drainage. This depth of slab resulted from figuring the restraint afforded by 1-in. square bars spaced 1 ft. 6 in. center to center at each abutment. The reinforcement in the slab consists of 1-in. square bars spaced 5 in. center to center, alternate bars being bent upward.

As in the case of the bridge described previously, each girder has a total depth of 8 ft. 9 in., a 2-ft. 3-in. stem and a 3-ft. 3-in. top flange width. The tensile reinforcement in each girder consists of eleven 1 1/4-in. straight square bars, and nine 1-in. square bars, of which seven are bent up to take diagonal tension. For this latter purpose, 3/4-in. round stirrups were also added with close spacing at the obtuse-angle junction, where the reaction and shear are the greatest. The



Cross-section of the Track Slab for the Crossing Over the Erie

compression reinforcement in the girders consists of ten 1 1/4-in. square bars, of which nine are in the top plane. The overall length of the girders is 73 ft. 2 in.

#### Method of Construction

The abutments of the bridge are of concrete masonry and of the semi-gravity type, with both heel and toe reinforced with 3/4-in. and 1-in. square bars, 2 ft. center to center. The wing walls immediately adjoining the abutments are also of the semi-gravity type, but the outer ends of these walls have gravity sections. Two of the wing walls are at right angles to the abutments and are relatively short, but the other two are placed at angles of 15 deg. with the faces of the abutments, and are 189 ft. in length.

In carrying out the work at this undercrossing, the abutments were built in advance of the other parts of the structure in order to permit the early construction of the westbound passenger track. After the abutments were completed, the floor slab and the girders were constructed. During this latter work, which was done without interfering with the freight traffic or with passenger traffic on the undercrossing track, a temporary clearance of 18 ft. was maintained over the passenger track, this being made possible by special falsework designed by the writer. Like the structure described previously, the deck of this bridge was waterproofed with two-ply membrane of asphalt-saturated cloth, which was protected with asphalt blocks. Along





Looking West at Denville, N. J., Where the Westbound Passenger Track Crosses Under the Two Freight Tracks

the vertical surfaces of the parapets, brick was used as a protection for the waterproofing. The backs of the abutments and wing walls were waterproofed with two coats of emulsified asphalt.

Both of the structures described were designed for Cooper's E-65 loading, increased by the impact resulting from the impact formula,

$$I = \frac{LL}{DL + LL}$$

The unit stresses used in the concrete work were 650 lb. per sq. in. in compression under flexure, 500 lb. per sq. in. in direct compression, 40 lb. per sq. in. in shear and 100 lb. per sq. in. in bond stress. The allowable tension stress in the reinforcing steel was 16,000 lb. per sq. in.

#### Water Cement Ratio Was Used

In the specifications for these structures, the water-cement ratio was made the basis of the required strength for the various classes of concrete. For 2,500-lb. concrete,  $6\frac{1}{4}$  gal. of water, including the moisture in the aggregate, was called for, while for the 2,000-lb. concrete,  $6\frac{3}{4}$  gal. was permitted as a maximum. The higher-strength concrete was specified for the slabs and girders, and the lower strength for the abutments and wing walls.

A careful check was maintained on all of the concrete work by making up and testing from four to six test cylinders from each pour of concrete, these cylinders being cured in the same manner as the concrete in the forms. The concrete used in the test cylinders was taken from the forms rather than directly from the mixer, so as to insure actual samples of the concrete put in place. All of the cylinders were tested at the Lackawanna's testing laboratory at Scranton, Pa., two of the cylinders being tested at the end of 28 days, and the remaining cylinders at the end of 60 days. In order to insure observance of the specifications for the concrete work, the following special instructions were

furnished to the inspectors on the job for their guidance:

#### Instructions to Concrete Inspectors

##### Materials

Cement.—Should be fresh, no sign of set or hardening.

Sand.—Clean, well graded; make tests for organic and inorganic impurities. Decantation test should show no more than three per cent of impurities or loam.

Colorimetric test for vegetable matter.

Gravel or Stone.—Clean, maximum size  $1\frac{1}{4}$  in. for reinforced and  $2\frac{1}{2}$  in. for mass.

Water.—Clean, free from acid.

##### Mixing

Take account of moisture in aggregate, fine and coarse. Total water to be used inclusive of moisture in aggregate shall be no more than  $6\frac{1}{4}$  gal. per bag of cement for Class "A" concrete, and no more than  $6\frac{3}{4}$  gal. for Class "B" concrete. Add sufficient aggregate in the proportion of about two coarse to one fine to give a slump of 4 in. to 6 in. for Class "A" concrete and 2 in. for Class "B" concrete. If mixture is too harsh, take out some coarse aggregate; if oversanded, take out some sand.

Time of Mixing.—Each batch shall be mixed  $1\frac{1}{2}$  min. after all the ingredients, including water, are in the mixer. Under no circumstances shall this provision be waived to the extent that the time of mixing is less than  $1\frac{1}{5}$  min. (1 min. 12 sec.)

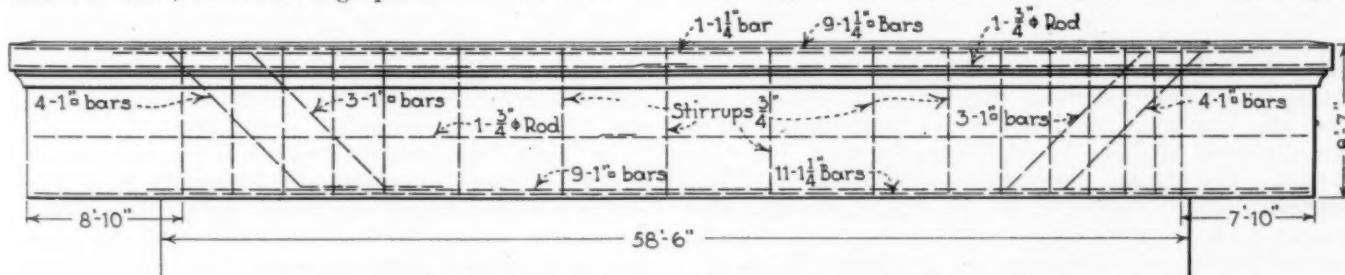
##### Placing

Concrete shall be placed immediately after discharge from mixer, as directly as possible, chuting being prohibited.

Concrete shall not be dropped from a height greater than 4 ft. It shall be worked and rodded particularly around reinforcement. Where bulkheads are set for a construction joint, such bulkheads shall be painted with "Bonding Context." Before the next pour is started, bulkheaded surfaces shall be subjected to water through a nozzle so as to leave a rough surface for bonding. Reinforcement must be cleaned of rust, and forms cleared of debris before concrete is deposited. In cold weather, heat must be maintained for at least three days. In hot weather, the concrete must be wetted thoroughly twice a day for 10 days (preferably covered with damp hay).

##### Test Specimens

Six-inch cylinders for stone up to  $1\frac{1}{2}$  in., and 8-in. cylinders for 2-in. stone. Take specimen from forms, not from mixer. Rod concrete well. Remove from cylinders all stones larger



A Diagrammatic Elevation of One of the Girders of the Denville Structure

than  $\frac{1}{4}$  in. in diameter and smooth off surfaces. Subject samples for at least 7 days to same treatment as structure, then ship to testing laboratory at Scranton.

No unforeseen difficulties were encountered in the construction of either of the two bridges, and the various steps of construction were carried out as planned, with the result that both structures present a splendid appearance.

#### Discussion of Concrete Girder Lengths

The writer believes that the two bridges described have the longest reinforced concrete girders carrying engine loadings, which have been constructed up to the present time. This raises the question as to whether this is the limit to which reinforced concrete can be used for this purpose. Various factors enter into the answer to this question. If limited to the allowable stresses which were used in these structures, we are undoubtedly very close to the limit of span lengths permissible, with the only alternative, that of increasing the amounts of compressive and shear reinforcement somewhat beyond those used in these two structures.

An analysis of the component parts of the moments and shears used in the girders of the structures described, discloses the fact that in one case over 50 per cent is due to dead load, while the remainder is due to live load and impact. As a result, the thought occurs naturally that the moments and shears could be reduced and, therefore, that the possible span length could be increased by reducing the dead load by means other than the use of compressive reinforcement. This may be done by the use of higher strength concrete with a reduction of the water-cement ratio, or by the use of light-weight aggregates.

#### Stronger Concrete vs. Compressive Reinforcement

A comparison of the relative economy of higher strength concrete and compressive reinforcement was made by the writer in 1926, with the conclusion that greater economy could be obtained by the use of additional cement than by the use of reinforcing steel for compression. This is because the compression steel is not utilized to its maximum capacity, whereas the additional cement is. It has been fully demonstrated recently that it is entirely feasible to obtain 3,500-lb., or even 5,000-lb. concrete in the field, and there is no doubt that when the railways see fit to take advantage of higher-strength concrete by permitting higher unit stresses in design, girders of 75-ft. span, and even 100-ft. span, will be designed for railroad loadings.

The solution by the use of light-weight aggregates is also coming to the fore. The direct reduction of the dead load which this expedient would afford is obvious, and when it is considered that the two factors can be combined, that is, light-weight aggregate and a greater proportion of cement over that used in the commonly employed mixtures, the possibilities of long-span concrete girder construction are very evident.

The bridges described, as well as all of the other improvements mentioned in this article, were planned and constructed under the general direction of G. J. Ray, chief engineer, and under the general supervision of M. H. Doughty, division engineer. The designs for the two long-span concrete bridges were made under the direction of J. L. Vogel, bridge engineer, and the writer. The actual construction work on the Erie crossing was in charge of W. H. Speirs, resident engineer, while the work on the westbound passenger main undercrossing near Denville was in charge of A. H. Henckel, resident engineer.

## New York Central Unification Approved

WASHINGTON, D. C.

A FORMAL order approving and authorizing the plan of the New York Central for a unification of 11,507 miles of its system lines by leasing for 99 years the properties of the Cleveland, Cincinnati, Chicago & St. Louis and the Michigan Central and certain subsidiaries, heretofore controlled by stock ownership, subject to conditions, was entered by the Interstate Commerce Commission on July 2 and made public the following day, in connection with a supplemental report. In a report dated January 14 the commission had found the proposed unification in the public interest but withheld its order pending fulfillment by the New York Central of the conditions then prescribed requiring the New York Central to offer to acquire six independent connecting short lines for considerations equal to their commercial value as determined by agreement or arbitration.

The commission in its supplemental report found that the offers made by the New York Central to the short lines were in compliance with the conditions prescribed in the previous report, although the terms as to some of the lines are still to be determined by arbitration, and subject to certain further conditions it entered the order. This first authorized the acquisition by the Big Four of control of the properties of the Cincinnati Northern and the Evansville, Indianapolis & Terre Haute, and then the acquisition by the New York Central of control of the Big Four system, including the Cincinnati Northern, the E. I. & T. H., the Peoria & Eastern and the Kankakee & Seneca, and also of the Michigan Central and the Chicago, Kalamazoo & Saginaw.

Commissioners Eastman, McManamy and Taylor dissented, for reasons given in connection with the earlier report.

The New York Central had presented authenticated documentary evidence concerning the negotiations conducted with each of the short lines involved. This showed that it had obtained an option to purchase all the stock of the Owasco River from the International Harvester Company for \$75,000 cash. Conferences were also held with representatives of the Boyne City, Gaylord & Alpena, the Chicago, Attica & Southern, the Federal Valley, the Fonda, Johnstown & Gloversville and the Ulster & Delaware at which the New York Central made specific offers to acquire the various properties involved for considerations deemed by it to be equal to their commercial value but in no instance were the parties able to reach an agreement on the commercial value. Consequently on March 6 the New York Central notified the other parties, except the Fonda, that it desired to arbitrate the matter. Arbitration agreements have been entered into with the Federal Valley and the Alpena and arbitrators have been chosen under an understanding with the Ulster. The Attica has also selected an arbitrator but had asked the commission to deny the New York Central's supplemental petition for an order as premature.

The Fonda company had asked the commission to re-open the case, being dissatisfied with the New York Central's offer but this was denied by the commission. The Fonda, Attica, the Federal Valley and the Ulster companies all filed answers to the New York Central petition taking the position that it had not complied with



the commission's conditions. As to this the report says:

It seems clear the sense of our condition is that, subject to ultimate approval by us, the considerations, equal to commercial value, payable by the New York Central for properties of the short lines, are to be determined by agreement between the parties, or agreement failing, then by arbitration. However, inadequate the initial offers of the New York Central may have been deemed by the short lines, once the fact of irreconcilable disagreement became fixed it was the duty of the parties to resort to arbitration. Since provision for arbitration has or can yet be made by legally enforceable contracts, and those contracts will bind the New York Central to make further offers in accordance with the awards of the arbitrators, as approved by us, we think the contentions of the Attica, the Fonda, the Federal Valley, and the Ulster are without merit. Certainly there is no substance in the Federal Valley's observation that the third arbitrator has not been selected. The arbitration agreement between the New York Central and the Federal Valley expressly provides that if the two arbitrators chosen by the parties to the contract shall fail, within a designated time, to select the third, then the third arbitrator may be appointed by the senior judge of the Federal court named in the contract.

We are of opinion and find that the offers of the New York Central, and steps taken subsequent thereto, are in bona fide compliance with the condition prescribed in our previous report. We believe, nevertheless, that additional

precautions may reasonably and ought to be provided in order to insure that there be no miscarriage in the final consummation of our purposes. Accordingly our authorization and approval herein will be upon the further express conditions:

1. That opportunity be accorded to the Fonda within six months from the date hereof to designate an arbitrator and thereupon be entitled to arbitration in accordance with applicable provisions of the leases and to receive an offer from the New York Central for the purchase of its steam railroads in accordance with the award of the arbitrators.

2. That nothing herein shall be construed to relieve the Big Four or the New York Central from compliance with provisions of law applicable to any assumption of obligations and liabilities, etc., by virtue of execution of the proposed leases.

3. That no stock of the lessor companies shall be sold or otherwise disposed of by the Big Four or by the New York Central without authority from us first had and obtained.

4. That all conditions heretofore prescribed by us in this proceeding shall remain in full force and effect.

An order authorizing and approving the proposed acquisitions of control, upon the conditions aforesaid, will be entered; but jurisdiction is retained to reopen the proceeding, on our own motion or for good cause shown, for the entry of such supplemental orders herein as we may deem necessary or appropriate.

## Michigan Central Net Increases

*Great strides made in improving operating efficiency—  
Large surplus aids high percentage return on stock*

THE Michigan Central's freight traffic in 1928 totaled 4,522,458,000 revenue ton-miles—which compares with 4.3 billion in 1927, 4.53 billion in 1926 and 4.86 billion in the peak year 1923. Total operating revenues were \$93,217,493, which figure has been exceeded only twice since federal control (\$94,798,042 in 1923 and \$95,524,342 in 1926). Operating expenses totaled \$62,643,935, as compared with \$67,639,532 in 1923 and \$64,957,364 in 1926—the two previous peak years since federal control. Net revenue from railway operation totaled \$30,573,558—the highest figure ever attained—and net income available for dividends reached a total of \$19,389,419, the highest figure on record. These figures are set out in detail, with comparisons, in Table I.

Net income in 1928 was equivalent to 103.5 per cent on outstanding capital stock. Dividend disbursements,

however, were limited to 40 per cent and the surplus for the year carried to profit and loss totaled \$11,894,859, or 63.5 per cent on capital stock.

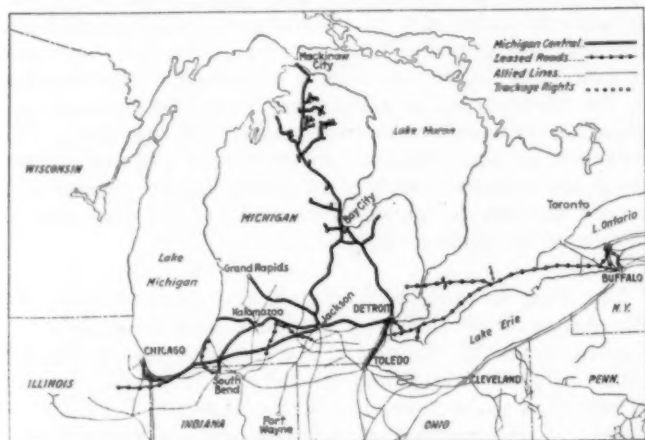
As was pointed out in an article summarizing the operations of this property which was published in the *Railway Age* of July 28, 1928, page 147, the primary cause of the rapid increase in earning power has been the extraordinary development of traffic in its territory.

### Steady Increase in Operating Efficiency

This has not by any means been the sole reason for its increased prosperity, however, as Table I also shows. Operating revenues in 1923, for instance, were larger by 1.7 per cent in 1923 than they were in 1928. Operating expenses in 1923, however, were 8 per cent greater than they were in 1928. The operating ratio in 1928 was 67.20, or 2.15 points less than in 1927, 0.80 points less than in 1926 and 0.15 points less than in 1925, which had the lowest ratio heretofore attained.

A steady increase in operating efficiency, therefore, has been an important contributor to the company's unusual record of earnings. Contributing also to the high ratio of earnings to common stock is the relatively low proportion, 22.5 per cent, which stock bears to total capitalization, and to the fact that the corporate surplus stands at \$100,428,397, or 20.7 per cent in excess of total capitalization.

The steady increase in freight service operating efficiency is continuing and is strikingly shown in Table II, which compares selected statistics bearing on this performance for 1928 and 1927. It will be noted that, while gross ton-miles were 6.9 per cent higher in 1928 than in 1927 and net ton-miles 4.9 per cent greater, freight train-miles increased only 1.5 per cent and freight train-hours actually declined 3.6 per cent. Car-



The Michigan Central

miles per car-day and net ton-miles per car-day showed a substantial increase, as did both gross and net tons per train—in spite of slight declines in tons per loaded car and the ratio of loaded to total car-miles.

Train speed was increased 5.4 per cent to 15.7 m. p. h. and gross ton-miles per train-hour averaged 30,635 and net ton-miles per train-hour 10,699—increases of 10.9 per cent and 8.8 per cent respectively. Coal con-

express and other passenger train revenues accounted for an additional five millions, bringing passenger train service revenues well in excess of 25 per cent of the total. Nor has the loss in passenger business been marked. There has been, to be sure, a slight declining tendency, but nothing at all comparable with the losses which many railroads have suffered, as the following tabulation of passenger revenues (excluding mail, ex-

Table I—Comparative Traffic and Revenue Statistics

Year ended Dec. 31	Mileage	Revenue tons	Revenue ton-miles (thousands)	Average haul	Revenue per ton-mile, cents	Total operating revenues	Total operating expenses	Net operating revenue	Operating ratio	Net after charges
1920.....	1,866	20,203,776	4,824,740	160	1.144	\$87,790,799	\$77,140,559	\$10,650,240	87.87	\$3,805,785
1921.....	1,862	20,471,263	3,127,686	153	1.462	72,911,852	52,551,945	20,359,908	72.08	7,725,337
1922.....	1,862	25,261,826	3,852,216	152	1.446	83,426,407	59,576,357	23,850,050	71.41	12,818,271
1923.....	1,863	32,323,248	4,863,930	150	1.319	94,798,042	67,639,532	27,158,510	71.35	14,176,448
1924.....	1,862	29,273,172	4,265,934	146	1.370	87,614,662	62,139,524	25,455,138	70.95	13,627,534
1925.....	1,871	33,936,772	4,500,781	139	1.437	91,864,377	61,893,039	29,971,338	67.37	18,806,194
1926.....	1,855	33,181,573	4,527,068	136	1.425	95,524,343	64,957,364	30,566,979	68.00	18,963,899
1927.....	1,858	31,415,851	4,282,486	131	1.409	89,750,602	62,244,288	27,506,314	69.35	16,866,558
1928.....	1,858	32,100,897	4,522,458	136	1.417	93,217,493	62,643,935	30,573,558	67.20	19,389,419

sumption per 1000 gross ton-miles fell 3.5 per cent to 110 lb. and locomotive-miles per locomotive-day rose 14 per cent to an average of 74.8.

With the progress being made in the projected lease by the New York Central of the Michigan Central, the Big Four and other of its controlled companies, it may be assumed that annual reports of the Michigan Central as an operating company may soon appear no more. If such is the case, then there will be the satisfaction of observing that the last reports issued by the company are also its best. The New York Central at the end of 1928 owned 99.29 per cent of the Michigan Central's capital stock.

The Michigan Central's traffic in 1928 was divided among the various categories of commodities as follows: Agricultural products, 7.6 per cent; animal products, 2.9; products of mines, 44.4 (bituminous coal, 22.9 and anthracite, 2.7 per cent); forest products, 5.6; manufactures and miscellaneous 36.7; and l. c. l., 2.8. The high ratio of manufactured goods to total reflects

press and other passenger train revenues) from 1920 to 1928 inclusive will show:

1920	\$23,557,853	1924	\$20,598,595
1921	20,016,387	1925	20,840,641
1922	19,247,622	1926	21,537,939
1923	21,466,657	1927	20,202,686
1928	\$19,792,566		

The maintenance of earnings from this source has been largely due to the high grade through service which this company has built up in conjunction with the parent company, the New York Central. This is clearly demonstrated by the fact that, while the decline in passenger revenues from 1923 to 1928 was only 7.8 per cent, the decrease in the number of passengers carried was 29.5 per cent. The average miles traveled per passenger in 1923 was 122 miles; in 1928 it had risen to 159—an increase of 30 per cent. In other words, the company has largely counteracted the loss of local business by securing a substantial increase in the volume of its through business.

#### Maintenance and Transportation Ratios

Maintenance and transportation expenses and their percentage to operating revenues during the past five years have been as follows:

Year	Maintenance of Way	% of Oper. Rev.	Maintenance of Equipment	% of Oper. Rev.	Transportation	% of Oper. Rev.
1924	\$11,177,679	12.8	\$16,457,962	18.8	\$30,494,421	34.8
1925	10,415,588	11.3	17,618,141	19.2	29,219,147	31.8
1926	11,528,183	12.1	18,064,540	18.9	29,900,804	31.3
1927	10,344,919	11.5	16,718,888	18.6	29,525,765	32.9
1928	9,993,461	10.7	18,429,411	19.8	29,414,897	31.6

Comparing 1928 with 1927, a decline in the maintenance of way and transportation ratios and a slight increase in the transportation ratio will be noted. The decrease in maintenance of way expense is largely ascribable to a decrease in tie renewals, made possible by the increasing proportion of treated ties in use; and to a decrease in the application of ballast. The decrease in the transportation ratio came from the constant application of more economical methods of operation. The increase in maintenance of equipment expenses arose from the expense incident to giving heavy repairs to a larger number of locomotives and freight cars and to increased retirement charges.

THE PORT OF ALBANY is now 40 per cent completed, and the Albany Port District Commission expects to have the terminal ready by the time the government has the channel of the Hudson river deepened. Peter G. TenEyck, chairman of the Commission, says that about \$2,200,000 has been expended in the purchase of property and on contracts, and that the construction work is well ahead of the program.

Table II—Comparison of Selected Freight Operating Statistics

	1928	1927	Per cent of change Inc. Dec.
Mileage operated	1822	1820	
Gross ton-miles (thousands)	13,291,829	12,435,692	6.9
Net ton-miles (thousands)	4,642,306	4,425,794	4.9
Freight train-miles (thousands)	6,826	6,724	1.5
Freight locomotive-miles (thousands)	7,339	7,179	2.2
Freight car-miles (thousands)	388,540	364,357	6.6
Freight train-hours	433,881	450,095	3.6
Car-miles per day	30.3	29.3	3.4
Net tons per loaded car	19.6	19.9	1.5
Per cent loaded to total car-miles	60.9	61.0	0.2
Net ton-miles per car day	362	352	2.8
Freight cars per train	57.9	55.2	4.9
Gross tons per train	1,947	1,849	5.3
Net tons per train	680	658	3.3
Train speed, miles per train hr.	15.7	14.9	5.4
Gross ton-miles per train-hour	30,635	27,629	10.9
Net ton-miles per train-hour	10,699	9,833	8.8
Lb. coal per 1,000 gross ton-miles	110	114	3.5
Loco. miles per loco. day	74.8	65.6	14.0
Per cent freight locos. unserviceable	24.8	21.7	14.3
Per cent freight cars unserviceable	5.2	4.2	23.8

the great industrial growth which has taken place in the Michigan Central's territory. The predominance of high grade commodities likewise explains the relatively high average earnings per ton-mile—1.417 cents in 1928.

#### Passenger Revenues Hold Up Well

Passenger service is, relatively speaking, an important source of revenue for the Michigan Central. Receipts from passengers alone in 1928 totaled \$19,792,566 or 21 per cent of total operating revenues. Mail,



## Dearborn-Wagner Feedwater Purifier

**T**HE Dearborn Chemical Company, Chicago, has taken over the manufacturing and selling rights in the United States and Canada to the Dearborn-Wagner feedwater purifier, a locomotive appliance consisting of a specially constructed dome and a mud pocket installed on the locomotive boiler at the top and bottom of the front course, respectively.

This is standard equipment on the Deutsche Reichsbahn (German State Railway), with several thousand locomotives thus equipped. Boiler feedwater, after passing through the heater or injector, enters the specially constructed dome where all dissolved gases are immediately liberated to pass off with the steam. This removes the principal cause of corrosion and, at the same time, brings about the precipitation of scale-forming minerals and provides for their collection and easy, efficient removal through the mud pocket.

The feedwater purifier, shown diagrammatically, is built up from the following parts:

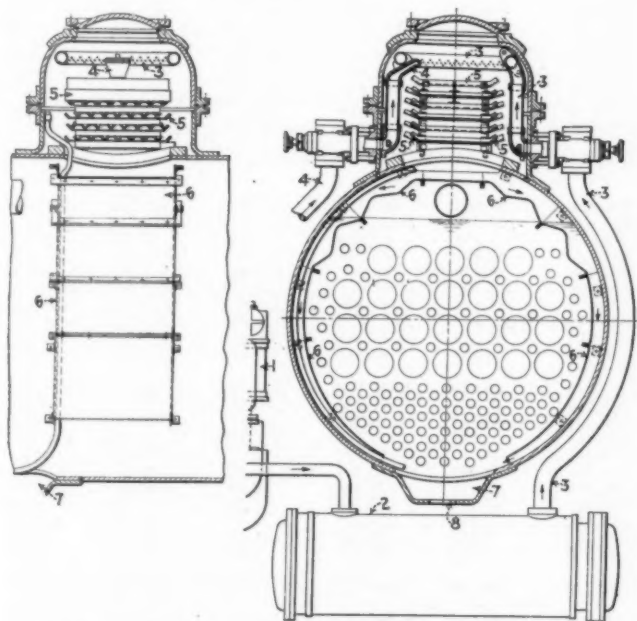
First—A steam dome arranged on the first course of the boiler to be constructed for the individual locomotive according to the railroad's standard as a second or additional dome to the usual dome for collecting steam.

Second—A feedwater pipe (3) leading from the boiler feed pump (1) through the feedwater heater (2) into the purifier dome and ending here in an annular pipe which is provided with small perforations for discharging the feedwater into the dome.

Third—A feedwater pipe (4) which conducts from the injector into the dome, the end of which is constricted to subdivide the discharged water into a fine stream or spray.

Fourth—A set of superimposed grates of angle sections (5) which continue to subdivide the feedwater and delay its downfall into the boiler.

Fifth—Two water pipes or separating plates (6) secured to the inner wall of the boiler for receiving the water from the set (5) and extending substantially to the bottom of the boiler barrel where the water is discharged into the water space of the boiler in two streams running one against the other.



Diagrammatic Drawing of the Dearborn-Wagner  
Feedwater Purifier

The feedwater supplied to the purifier dome by the feedwater pipe (3) is heated from 190 deg. F. to 220 deg. F. in the feedwater heater; therefore, when discharged into the purifier dome, it will immediately condense such large quantities of steam that a rush of steam is formed which moves towards the top of the dome from the boiler at high velocity. The feedwater discharged from the small perforations of the feed pipe (3), and finely subdivided by being thus discharged, is on its way into the boiler intimately mixed up with a tornado-like steam current blowing from the boiler towards the top of the dome. Because of this counter flow, the temperature of the water after leaving the perforated pipe increases with great rapidity. When it arrives at the top row of the set (5) it has been heated to about 290 deg. F., at which temperature not only considerable of the gases are separated from the water but a majority of the scale-forming solids are precipitated. The water now flows down through the set (5) while its direction is varied and subdivided and its particles are exposed to the rushing steam so that finally, upon leaving the set and before arrival at the water level, the feedwater is heated practically to boiler temperature. Under these conditions a majority of the scale-forming solids should be precipitated and, during this heating and purifying process, the speed of the rushing steam will be so great as to wash out the separated gases immediately from the dome into the steam space of the boiler from which they will be discharged with the steam flowing through the throttle into the cylinders to be exhausted to the atmosphere.

With the scale-forming solids in the feedwater properly provided for, either by external or internal treatment, and with the mud which accumulates in the boiler regularly removed by the systematic use of the blow-off, flues and sheets have been found practically clean and with almost a bright metal surface after six months' operation. It is stated that corrosion has never been found on the inner walls of the dome and the steam space of the boiler in locomotives equipped with the feedwater purifier but, in exceedingly bad corrosive water districts, corrosion starts on the top row of the easily and cheaply replaced angle sections (5).

Should solids precipitated from the water deposit on the set (5) while water is flowing down or should the purifier dome require inspection or repairs, the opening, cleaning, repairing and closing can be performed by two men in not more than two hours' time. The water leaving the set of angle sections (5) contains considerable separated or precipitated solids; in order to remove the majority of this residue from the boiler, the water is conducted down to the bottom of the boiler barrel by the two pipes or separating plates (6) where, as the water currents from the pipes meet in opposite directions, a sort of backwater is formed which permits the solids to deposit in the mud pocket (7) from which they are discharged by the blow-off cock (8).

When the water is softened by lime-soda ash, zeolite or other methods of external treatment, the formation of scale is practically prevented, but corrosion of sheets and flues often develops because of the removal of the protective film of scale. In some instances, the damage caused by corrosion and pitting may be far greater than that caused by scale-forming solids which were in the feedwater before the water was treated externally.

In the treatment of boiler feedwater by the internal method, where reactions develop under operating heat and pressure, the feedwater purifier assists by the removal of excessive amounts of dissolved gases and, at the same time, aids the internal treatment by speeding up the physical-chemical reactions.

# Freight Commodity Statistics for 1928

WASHINGTON, D. C.

**B**ITUMINOUS coal constituted the largest single item of traffic handled by the railroads in 1928, from the standpoint of freight revenue, accounting for \$784,470,255, according to a compilation of freight commodity statistics just made public by the Interstate Commerce Commission which gives for the first time for a full year the freight revenue received by classes of commodities. In an order dated November 22, 1927, the Class I railways were required to report to the commission quarterly concerning commodities carried from and after January 1, 1928, divided into 157 classes, together with the revenue received from each and the tonnage terminating. All l.c.l. freight accounted for \$512,528,506 of the revenue, according to the compilation, while manufactures and miscellaneous, not

otherwise specified, accounted for \$345,470,729. The total revenue from the group comprising lumber, shingles and lath amounted to \$258,131,107, while petroleum oils, refined, and all other gasolines, produced \$252,021,523.

The total tonnage originated for the year amounted to 1,285,942,976, as compared with 1,281,611,186 in 1927 and 1,336,142,323 in 1926. The tons carried amounted to 2,361,622,636, as compared with 2,363,638,942 in 1927 and 2,465,368,606 in 1926. The commission's statistics, as published in Statement No. 29,100, give the figures by districts and by individual roads. The statement showing the freight traffic handled and the revenue, for the Class I roads of the United States follows:

No.	Commodity group or class	Revenue freight originated		Revenue freight terminated		Total freight traffic (including duplications)		Freight revenue (dollars)
		Number of carloads	Number of tons	Number of carloads	Number of tons	Number of carloads	Number of tons	
GROUP I. PRODUCTS OF AGRICULTURE (C. L.)								
10	Wheat	630,010	26,950,060	687,632	29,481,269	909,618	38,850,964	117,553,734
20	Corn	447,539	17,044,938	484,117	18,310,096	725,223	26,956,377	65,075,775
30	Oats	192,329	5,888,045	214,039	6,543,141	350,557	10,553,694	22,101,177
40	Barley and rye	109,686	4,297,068	125,605	4,925,917	177,439	6,956,233	17,570,571
41	Rice	40,038	1,067,702	38,303	1,030,411	62,298	1,597,905	4,778,389
42	Grain, N. O. S.	5,124	141,001	6,571	182,250	10,738	291,990	699,661
50	Flour, wheat	393,731	9,656,166	423,521	10,550,126	872,587	21,688,827	44,759,942
51	Meal, corn	13,627	268,232	15,577	309,183	28,080	560,012	1,094,916
52	Flour and meal, edible, N. O. S.	35,090	829,480	45,103	1,069,808	98,663	2,400,918	4,474,415
60	Cereal food preparations, edible, N. O. S.	44,913	831,799	49,148	925,009	107,829	1,959,231	5,203,793
61	Mill products, N. O. S.	446,696	9,748,620	498,650	10,962,943	885,103	19,345,231	34,208,257
70	Hay and alfalfa	263,644	3,309,381	275,085	3,464,752	501,930	6,284,459	17,821,602
71	Straw	54,586	689,656	55,861	706,043	84,663	1,069,564	2,138,879
80	Tobacco, leaf	91,474	944,955	89,783	942,454	156,564	1,661,761	7,863,678
90	Cotton in bales	309,056	3,423,519	325,107	3,483,236	639,350	7,256,828	39,204,343
91	Cotton lint, noils, and regins	23,957	348,660	24,521	357,021	63,679	973,852	3,271,648
100	Cottonseed	107,211	2,707,933	112,390	2,830,576	137,900	3,460,263	9,668,890
101	Cottonseed meal and cake	97,693	2,275,922	96,593	2,247,456	177,889	4,205,653	8,966,264
110	Oranges and grapefruit	83,315	1,364,920	85,520	1,405,411	338,501	5,649,895	38,138,760
111	Lemons, limes, and citrus fruits, N. O. S.	11,952	177,930	15,346	229,878	60,990	909,457	5,646,947
120	Apples, fresh	117,625	1,903,442	127,442	2,051,671	307,026	5,089,166	29,504,928
121	Bananas	94,712	1,005,030	94,349	1,009,188	187,687	2,010,602	15,972,021
122	Berries, fresh	11,255	100,072	12,445	115,495	30,881	290,425	2,760,325
123	Cantaloupes and melons, N. O. S.	36,560	414,349	46,273	540,390	168,925	1,934,493	12,676,246
124	Grapes, fresh	74,303	1,138,493	85,158	1,301,379	326,313	5,065,854	35,160,144
125	Peaches, fresh	49,814	614,058	55,918	690,232	139,911	1,604,205	9,677,851
126	Watermelons	40,247	540,482	43,194	582,195	132,720	1,796,493	6,666,412
127	Fruits, fresh, domestic, N. O. S.	44,366	625,626	45,523	646,810	145,510	2,004,765	13,808,359
128	Fruits, fresh, tropical, N. O. S.	4,760	59,818	4,438	60,393	18,531	234,680	999,021
130	Potatoes, other than sweet	254,539	4,511,075	284,150	5,080,931	740,131	13,390,209	46,776,281
140	Cabbage	40,249	519,307	45,034	582,915	119,376	1,549,072	6,919,255
141	Onions	37,011	515,835	39,426	547,342	110,063	1,572,855	7,045,595
142	Tomatoes	29,407	349,438	33,779	411,195	106,891	1,237,653	8,067,713
143	Vegetables, fresh, N. O. S.	151,928	1,740,147	168,418	1,957,012	573,588	6,664,006	44,322,674
150	Beans and peas, dried	28,209	655,788	31,451	733,950	70,290	1,730,335	6,980,479
151	Fruits, dried or evaporated	33,370	911,328	35,657	943,938	61,721	1,778,911	8,661,038
152	Vegetables, dry, N. O. S.	22,836	310,484	26,431	365,163	51,250	721,952	3,225,551
160	Vegetable-oil cake and meal, except cottonseed.	19,360	473,029	20,622	504,718	30,408	739,046	1,583,282
161	Peanuts	24,303	371,727	22,902	353,988	48,802	753,881	3,199,781
162	Flaxseed	13,842	542,372	14,023	548,996	17,199	674,535	2,409,144
163	Sugar beets	118,422	5,259,674	117,346	5,172,276	131,741	5,757,304	3,509,697
164	Products of agriculture, N. O. S.	156,586	3,494,350	166,830	3,721,901	298,893	6,316,591	20,808,931
(800)	Total Products of Agriculture	4,805,375	118,021,911	5,189,281	127,879,058	10,207,458	225,550,147	738,276,369
GROUP II. ANIMALS AND PRODUCTS (C. L.)								
170	Horses, mules, ponies, and asses	49,604	576,885	50,603	589,356	79,506	930,960	5,284,649
180	Cattle and calves, single-deck	688,205	7,923,694	719,357	8,280,293	1,006,913	11,538,784	49,492,830
181	Calves, double-deck	4,355	52,620	5,213	63,936	8,000	97,264	506,132
190	Sheep and goats, single-deck	56,277	453,407	52,897	432,124	77,885	635,096	2,733,691
191	Sheep and goats, double-deck	80,878	908,346	88,288	986,204	149,880	1,681,869	8,396,831
200	Hogs, single-deck	460,597	4,190,928	462,322	4,203,965	554,330	5,068,342	23,597,178
201	Hogs, double-deck	135,638	1,679,916	151,116	1,867,489	225,308	2,774,425	14,646,259
210	Fresh meats, N. O. S.	235,540	2,935,349	231,861	2,871,699	541,899	6,709,353	40,853,430
220	Meats, cured, dried, or smoked	45,805	691,918	48,749	745,584	108,266	1,669,565	9,604,784
221	Butterine and margarine	4,083	50,034	4,132	51,001	7,954	101,053	717,131
222	Packing-house products, edible, N. O. S., not including canned meats	88,804	1,461,049	85,019	1,377,780	187,324	3,144,324	15,125,274
230	Poultry, live	16,524	160,249	20,565	197,246	59,245	569,523	5,240,153
231	Poultry, dressed	20,658	246,401	22,843	274,227	66,671	795,042	6,995,757
240	Eggs	56,313	634,575	62,449	712,668	156,980	1,811,867	16,433,126
250	Butter	41,221	504,388	48,641	595,295	113,250	1,399,593	11,581,277
251	Cheese	19,844	249,706	21,138	267,927	47,491	597,676	4,209,966
260	Wool	32,846	393,870	34,011	399,484	76,095	983,489	6,170,446
270	Hides, green	33,152	712,562	33,192	719,116	75,255	1,636,698	6,351,995
271	Leather	11,818	201,926	12,937	221,222	33,553	580,594	2,042,198
280	Fish or sea-animal oil	3,885	102,272	5,569	126,735	10,159	273,074	925,461
281	Animals, live, N. O. S.	2,067	24,023	2,073	24,579	4,472	54,418	226,037
282	Animal products, N. O. S. (other than fertilizers and fertilizer materials)	74,439	1,479,730	78,269	1,600,073	134,027	2,670,689	11,504,062
(810)	Total Animals and Products	2,162,553	25,633,848	2,241,294	26,608,003	3,724,463	45,723,698	242,638,667
GROUP III. PRODUCTS OF MINES (C. L.)								
290	Anthracite coal	1,390,853	69,997,398	1,320,270	66,423,689	2,327,057	115,662,382	165,679,516



No.	Commodity group or class	Revenue freight originated		Revenue freight terminated		Total freight traffic (including duplications)		Freight revenue (dollars)
		Number of carloads	Number of tons	Number of carloads	Number of tons	Number of carloads	Number of tons	
300	Bituminous coal .....	6,494,869	346,057,487	5,992,518	315,049,252	13,132,156	696,301,014	784,470,255
310	Coke .....	480,481	16,241,157	478,777	16,226,368	784,604	26,121,464	33,450,751
320	Iron ore .....	1,240,122	68,684,091	1,108,232	68,535,846	1,851,182	109,639,248	79,196,789
330	Copper ore and concentrates .....	105,380	5,916,374	161,313	9,558,630	166,211	9,798,991	2,171,416
331	Lead ore and concentrates .....	25,592	1,352,799	25,142	1,264,152	40,951	2,124,065	1,868,454
332	Zinc ore and concentrates .....	29,113	1,334,539	39,415	1,816,286	80,359	3,664,876	4,629,817
333	Ores and concentrates, N. O. S. ....	62,090	3,234,331	68,963	3,636,940	140,605	7,228,406	8,735,195
350	Gravel and sand (other than glass or molding)....	1,608,691	85,667,157	1,613,080	85,894,285	2,058,627	108,673,766	73,893,420
351	Stone, broken, ground, or crushed .....	669,476	35,466,459	665,768	35,245,042	857,477	45,121,736	31,321,926
352	Stone, rough, N. O. S. ....	135,211	6,253,568	126,534	5,715,635	222,801	9,605,106	10,541,942
353	Stone, finished, N. O. S. ....	26,352	916,623	34,637	1,201,541	78,994	2,587,947	4,328,289
360	Petroleum, crude .....	221,244	7,632,492	194,641	6,686,562	477,482	16,343,631	34,005,692
370	Asphalt (natural, by-product, or petroleum).....	84,307	2,899,326	87,313	2,987,075	185,717	6,414,948	12,818,735
380	Salt .....	115,370	3,400,658	143,390	4,189,613	303,257	8,631,502	16,779,007
390	Phosphate rock, crude (ground or not ground).....	102,134	4,801,139	92,900	4,325,553	129,933	5,958,724	7,346,105
391	Sulphur (brimstone) .....	34,095	1,810,738	45,358	2,333,495	79,919	3,747,491	5,457,622
392	Products of mines, N. O. S. ....	702,394	34,976,756	747,362	37,673,716	1,188,011	56,860,081	55,984,962
(820)	Total Products of Mines .....	13,527,774	696,583,097	12,944,713	668,763,680	24,105,343	1,234,485,378	1,332,679,893
GROUP IV. PRODUCTS OF FORESTS (C. L.)								
400	Logs .....	952,198	30,832,653	982,459	31,649,909	1,045,787	33,601,257	20,777,439
401	Posts, poles, and piling .....	171,738	4,839,778	196,547	5,538,149	353,878	9,832,439	21,018,219
402	Wood (fuel) .....	134,585	3,868,454	136,454	3,917,005	154,455	4,419,185	3,870,945
410	Ties, railroad .....	136,197	4,239,705	111,323	3,427,624	226,843	7,043,204	12,824,589
420	Pulp wood .....	215,465	6,892,658	276,669	8,567,333	390,637	12,098,572	12,233,968
430	Lumber, shingles, and lath .....	1,484,011	39,415,454	1,734,813	45,800,616	4,094,068	106,600,815	258,131,107
431	Box, crate, and cooperage materials .....	134,150	3,931,166	140,623	3,224,075	293,154	6,761,215	17,814,189
432	Veneer and built-up wood .....	12,080	267,628	11,234	246,281	26,155	593,299	1,897,444
440	Rosin .....	32,559	552,283	38,488	650,030	60,115	1,157,317	2,581,128
441	Turpentine .....	3,355	68,953	3,535	72,646	9,440	217,470	719,695
442	Crude rubber (not reclaimed) .....	17,261	453,528	16,612	431,602	41,813	1,107,429	3,910,047
443	Products of forests, N. O. S. ....	114,467	2,212,677	123,562	2,406,136	212,412	3,915,039	7,839,223
(830)	Total Products of Forests .....	3,408,066	96,736,937	3,772,319	105,931,406	6,908,757	187,347,241	363,617,993
GROUP V. MANUFACTURES AND MISCELLANEOUS (C. L.)								
450	Petroleum oils, refined, and all other gasolines.....	1,505,537	42,562,231	1,549,566	43,919,938	3,075,195	86,762,088	252,021,523
451	Fuel, road, and petroleum residual oils, N. O. S. ....	352,085	11,893,736	329,512	11,084,977	594,123	19,734,434	45,950,560
452	Lubricating oils and greases .....	169,744	3,721,437	165,760	3,622,019	356,238	7,908,543	23,168,130
453	Petroleum products, N. O. S. ....	11,679	302,392	10,896	281,518	22,426	564,227	1,492,985
460	Cottonseed oil .....	31,192	914,287	31,815	931,550	65,831	1,917,415	5,691,944
461	Linseed oil .....	10,950	284,516	11,139	285,722	21,926	572,274	1,836,327
462	Vegetable oils, N. O. S. ....	12,939	361,911	12,840	345,901	33,466	939,489	3,296,198
470	Sugar (beet or cane) .....	138,806	4,040,203	165,605	4,684,008	313,487	9,031,689	34,240,017
471	Table sirups and edible molasses .....	28,947	828,549	31,173	911,453	66,594	1,935,718	5,800,432
472	Molasses, blackstrap, and beet residual .....	16,479	735,663	15,444	683,734	28,513	1,246,116	3,114,323
490	Iron, pig .....	151,555	8,033,516	147,476	7,830,678	224,890	11,837,529	14,113,938
491	Iron and steel, rated 6th class in official classification, N. O. S. ....	102,240	5,129,797	100,172	5,013,551	157,254	7,885,116	8,802,148
500	Rails, fastenings, frogs, and switches .....	60,867	2,551,160	48,247	1,996,636	113,040	4,783,941	8,328,465
510	Cast-iron pipe and fittings .....	79,691	1,899,837	72,948	1,740,645	185,637	4,543,922	11,581,424
511	Iron and steel pipe and fittings, N. O. S. ....	163,523	5,044,761	168,226	5,163,492	413,501	13,245,948	43,941,113
512	Iron and steel: Nails and wire, not woven .....	67,439	1,667,427	61,754	1,514,904	130,368	3,233,327	9,145,999
513	Iron and steel, rated 5th class in official classification, N. O. S. (also tin andterne plate) .....	1,017,159	33,386,293	1,028,436	33,560,192	1,895,858	60,527,410	141,715,554
520	Copper: Ingot, matte, and pig .....	22,454	999,088	22,099	899,666	73,223	3,269,033	7,560,160
521	Copper, brass, and bronze: Bar, sheet, and pipe....	14,107	358,105	16,187	468,757	34,018	949,590	2,701,628
522	Lead and zinc: Ingot, pig, or bar .....	30,215	1,217,734	39,072	1,561,820	103,337	4,255,691	9,191,794
523	Aluminum: Ingot, pig, or slab .....	2,851	73,413	3,682	102,958	7,604	219,375	881,675
530	Machinery and boilers .....	210,347	3,772,172	204,264	3,633,923	488,763	8,744,579	36,313,607
540	Cement, natural or Portland (building) .....	687,122	26,079,815	717,407	27,207,133	1,290,260	48,590,249	70,891,475
550	Brick, common .....	212,652	7,921,124	222,250	8,295,967	348,578	12,892,245	15,552,562
551	Brick, N. O. S., and building tile .....	287,557	10,391,559	278,582	10,054,041	510,933	18,263,556	27,883,745
552	Artificial stone, N. O. S. ....	23,781	705,674	23,759	721,989	42,857	1,288,641	2,288,415
560	Lime, common (quick or slaked) .....	123,705	2,797,520	135,224	3,094,489	242,301	5,481,273	9,447,252
561	Plaster (stucco or wall) and dry kalsomine .....	92,708	2,502,024	97,714	2,685,558	200,783	5,479,169	10,341,353
570	Sewer pipe and drain tile (not metal) .....	143,939	2,555,723	142,929	2,540,553	259,561	4,675,101	9,380,483
580	Agricultural implements and parts, N. O. S. ....	93,005	1,333,723	93,341	1,347,237	183,224	2,708,514	15,325,257
581	Vehicles, horse-drawn, and parts, N. O. S. ....	6,709	93,425	7,186	98,599	15,641	211,021	1,088,030
582	Tractors and parts .....	34,861	475,772	36,177	494,153	74,885	1,061,275	6,093,974
583	Railway car wheels, axles, and trucks .....	13,913	401,333	11,535	334,853	23,403	675,468	1,833,150
590	Automobiles (passenger) .....	616,214	3,705,214	627,717	3,800,461	1,812,940	10,976,869	131,335,521
591	Autotrucks .....	30,740	257,802	32,687	275,151	83,880	685,725	6,684,920
592	Automobiles and autotrucks, K. D. and parts, N. O. S. ....	234,934	4,051,729	260,813	4,345,782	599,613	10,097,194	43,798,798
593	Automobile and autotruck tires .....	54,219	736,023	62,007	824,489	163,849	2,200,697	12,291,805
610	Furniture, metal .....	18,432	226,459	18,340	224,020	41,811	510,928	2,720,166
611	Furniture, other than metal .....	104,696	835,406	117,743	938,784	289,748	2,307,639	16,362,337
620	Beverages .....	41,379	813,182	42,561	833,102	73,891	1,420,267	5,107,716
630	Ice .....	149,327	3,922,153	151,221	4,017,985	167,511	4,477,787	4,702,930
640	Fertilizers, N. O. S. ....	491,553	12,859,221	479,885	12,663,082	756,573	20,064,786	37,233,314
650	Newsprint paper .....	58,670	1,448,934	127,057	3,183,055	299,472	7,494,670	15,386,916
651	Printing paper, N. O. S. ....	77,899	1,853,754	78,169	1,856,568	170,634	4,085,294	10,522,888
660	Alcohol, denatured or wood .....	16,893	368,227	17,277	379,325	39,812	894,562	2,706,752
661	Sulphuric acid .....	49,528	2,279,672	48,836	2,227,709	77,511	3,256,690	5,444,732
662	Explosives, N. O. S. ....	20,318	330,562	19,628	317,809	46,389	757,790	5,845,962
670	Cotton cloth and cotton fabrics, N. O. S. ....	53,974	530,324	54,931	545,106	155,348	1,545,449	6,881,471
671	Bagging and bags, burlap, gunny, or jute .....	23,495	406,860	22,824	404,710	47,015	837,401	3,309,494
680	Canned food products, N. O. S. ....	211,457	4,804,656	222,714	5,077,018	475,380	11,114,237	44,203,436
690	Tobacco, manufactured products .....	10,813	200,208	10,317	195,602	27,453	499,608	3,341,609
691	Paints in oil and varnishes .....	22,590	496,654	24,015	534,953	48,598	1,095,927	4,191,378
692	Furnace slag .....	166,205	8,784,484	154,846	8,160,580	207,039	10,893,458	6,602,512
693	Scrap iron and scrap steel .....	299,767	11,746,937	302,788	11,847,193	470,367	18,387,372	24,863,015
694	Paper bags and wrapping paper .....	68,209	1,511,719	68,583	1,520,569	165,248	3,681,933	9,785,325
695	Paperboard, pulpboard, and wallboard (paper) .....	105,950	2,318,165	109,790	2,409,372	226,489	4,987,983	11,753,117
696	Building paper and prepared roofing materials .....	92,181	2,034,812	92,617	2,036,681	186,967	4,121,420	10,842,453
697	Building woodwork (millwork) .....	28,931	521,802	30,295	551,420	83,694	1,597,721	5,555,985
698	Soap and washing compounds .....	53,114	1,109,912	54,214	1,130,093	106,192	2,211,888	8,320,781
699	Glass, flat, other than plate .....	17,633	506,020	15,630	415,746	38,718	1,079,677	3,689,494
700	Glass: Bottles, jars, and jelly glasses .....	84,043	1,496,045	80,794	1,437,732	183,840	3,297,019	10,113,906
701	Manufactures and miscellaneous, N. O. S. ....	2,709,722	56,820,396	2,807,317	59,354,205	5,540,646	115,240,966	345,470,729
(840)	Total Manufactures and Miscellaneous .....	11,833,638	312,013,252	12,138,033	318,620,916	24,178,346	605,255,923	1,640,485,102
(850)	Grand Total, Carload Traffic .....	35,737,406	1,248,989,045	36,285,640	1,247,803,063	69,124,367	2,298,362,387	4,317,698,024
710	All L. C. L. freight .....	.....	36,953,931	.....	37,113,275	.....	63,260,249	512,528,506
(860)	Grand Total, Carload and L. C. L. Traffic .....	.....	1,285,942,976	.....	1,284,916,338	.....	2,361,622,636	4,830,226,530

---

## New Books

---

### Books and Articles of Special Interest to Railroaders

(Compiled by Elizabeth Cullen, Reference Librarian,  
Bureau of Railway Economics, Washington, D. C.)

#### Books and Pamphlets

*Engineering News-Record Construction Costs 1910-1928.* Prices of materials, cost and volume indexes, unit prices on 1928 contracts, labor rates. 61 p. Pub. by Engineering News-Record, New York City. \$1.

*O'Fallon Decision and the Brandeis Dissent*, by Cecil F. Elmes. A general discussion of important points involved. 22 p. Pub. by Cecil F. Elmes Organization, Chicago, Ill. *Apply*

*Railway Electrification and Traffic Problems*, by Philip Buritt. With foreword by Frank Pick. Discussion of present and possible future traffic problems in connection with electrification. 197 p. Pub. by Sir I. Pitman & Sons, London and New York, 10 shillings, sixpence.

*Report of Wage and Personnel Survey, Field Survey Division, Personnel Classification Board.* "Wages in the railroad industry" p. 83, 96-97, 174-186, 190. House Doc. no. 602, 70th Cong., 2d sess. This board has a double task to "Prepare a classification plan for positions occupied by approximately 105,000 employees in the field services of the Government on the basis of their duties and responsibilities, and second, to propose a compensation plan for the same positions after a study of many economic factors and data not only affecting the compensation schedules for these positions but also touching the Government's general wage policy." p. 2. 511 p. Pub. by U. S. Govt. Print. Off. Washington, D. C., 60 cents.

#### Periodical Articles

*Locusts Hold Up a Freight Train on the Athens-Saloniki Line.* Photograph and notes of a distinct operating difficulty. National Geographic Magazine, July 1929, p. 38.

*A Railroad Is Never Finished*, by Sir Henry W. Thornton. Interview by Courtney Ryley Cooper. An illustrated history of recent achievements of the Canadian National. Saturday Evening Post, July 6, 1929, p. 8-9, 101-108.

*Squeezing the Profit Dollar Out Of Industry*, by Theodore M. Knappen. "Speed in transportation" p. 383-384. Magazine of Wall Street, June 29, 1929, p. 362-365.

*The Texas & Pacific Railway*, by Curtis G. Green. First article on history of the road and its motive-power. Illustrated. Baldwin Locomotive, July 1929, p. 26-35.

*Third South American Railway Congress.* Program of the Congress to be held in Santiago de Chile in December 1929. Section A includes topics on track and operation, B, materials and traction, C, operation, D, accounting and statistics, E, legislation and management, and F, general—the last comprising topics relating mostly to employee selection and policies. Pan American Union Bulletin, July 1929, p. 696-697.

*Railroad Consolidation.* This issue contains a dozen or so addresses and discussions of unification under the present law, advantages and disadvantages of consolidation, and pending consolidation legislation, made at the semi-annual meeting of the Academy of Political Science. (123 p.) Proceedings of the Academy of Political Science, June 1929.

*Report No. 1 (America, Great Britain, Dominions and Colonies, China and Japan) on the Question of the Use in Railway Work of Machines for Simplifying Statistical and Accountancy Work*, by W. E. Eppler. Prepared for presentation at the 11th International Railway Congress. Appendices discuss "timekeeping, payrolls, and labor distribution," compilation of freight commodity statistics, and "machine station accounting plan." Bulletin of the International Railway Congress Association, May 1929, p. 507-539.

---

## Looking Backward

---

### Fifty Years Ago

The purchase of a controlling interest in the Troy & Boston [now part of the Boston & Maine] by W. H. Vanderbilt takes the New York Central 48 miles further towards Boston, and places it in a position to give the Erie a sharp fight in its endeavors for a New England connection.—*Railway Review*, July 12, 1879.

The holders of a controlling interest in the securities of the Wabash and the St. Louis, Kansas City & Northern have agreed to a plan for consolidation of the two companies. The new company will be known as the Wabash, St. Louis & Pacific [now the Wabash] and will be made up of 1,674 miles of line.—*Railroad Gazette*, July 11, 1879.

The stockholders of the Grand Trunk [now part of the Canadian National] at a meeting in London, England, on June 30, approved the sale of the Riviere du Loup section, extending from Levis, near Quebec, to Riviere du Loup, 118 miles. The proceeds of the sale are to be applied to the purchase or construction of an extension to Chicago.—*Railway Age*, July 10, 1879.

### Twenty-Five Years Ago

On July 5 the federal courts at Cincinnati, Ohio, and Detroit, Mich., placed the Detroit Southern [now the Detroit, Toledo & Ironton], extending from Detroit to Ironton, Ohio, in receivership. Operating as it does nearly 500 miles of line, this railroad's receivership is the most important one which has occurred for several years.—*Railroad Gazette*, July 15, 1904.

A syndicate has obtained stock control of the Cincinnati, Hamilton & Dayton [now part of the Baltimore & Ohio], the Pere Marquette and the Chicago, Cincinnati & Louisville [now part of the Chesapeake & Ohio] and intends to bring about a merger of the properties under the name of the first road. The merged lines, 4,000 miles in length, will provide a through route between Cincinnati, Ohio, and Chicago and Buffalo, N. Y., via Detroit, Mich.—*Railway Age*, July 15, 1904.

### Ten Years Ago

During the first five months of 1919 the Class I railroads have earned \$105,000,000 of net operating income or \$213,000,000 less than the \$318,000,000 earned in the corresponding five months of the test period. The government's loss, however, is \$272,000,000 as the railroad rentals are payable in equal quarterly installments.—*Railway Age*, July 11, 1919.

Advocates of continued government operation of the railroads have gained an ally in the person of Joseph B. Eastman of Massachusetts, the most recently appointed member of the Interstate Commerce Commission. In a letter addressed to the Senate Committee on interstate commerce, Commissioner Eastman states, "Better results can, I feel, be obtained by maintaining and improving national operation than by returning to old methods in whatever guise."—*Railway Age*, July 11, 1919.

A new electrification project has been definitely assured as the result of an agreement between the Committee on Terminals of the City Council of Chicago and the Illinois Central relative to a contract ordinance for a new passenger station and appurtenant facilities. Under the agreement the Illinois Central must institute the electric operation of all suburban trains within seven years, of all freight service within the city limits within 15 years, and of all passenger service within 20 years.—*Railway Age*, July 11, 1919.



# Odds and Ends of Railroading

## Subterranean Reception

When President Crowley of the New York Central spoke over the radio recently, 100 employees of the Chicago Tunnel Railway formed a unique group of listeners. They were 50 ft. underground, listening in on a specially installed receiving set.

## Oldest Receipt Book

C. B. Crickmore, agent for the Pennsylvania at New Madison, Ohio, is still using a receipt record book, in which signatures for registered railroad mail are recorded, that has been in continuous use for 31 years. His claim to using the oldest receipt book will be hard to dispute.

## Twins

The Pennsylvania claims to employ more sets of twins than any other railway. Recently, the portraits of twins retiring at the age of 70 were run on this page. Now, we mention Joseph and Edward Durney, twins, both employed at the Wilmington shops, Maryland division.

## Lots of Sixes

E. T. McDowell, ticket seller at the Chicago Union Station, had a ticket transaction recently that involved plenty of sixes. McDowell issued ticket No. 6026 for seat No. 6, car No. 6, Chicago to Fort Wayne, Ind. He charged the passenger \$6.46, and reservation clerk No. 6 made the reservation for McDowell, whose number is 16. The patron gave his name as John Adams and volunteered his age as 66 years.

## More Railway Lingo

Additional contributions to the glossary of railway terms recently published on this page include the following:

Car inspector .....	Car knocker
Heavy steel freight car.....	Car monkey
Pick-up train .....	Battleship
Temporary track around an obstruction .....	Dog catcher
Small piece of rail to fill an opening between ends of rail .....	Shoo fly
	Dutchman

## New Museum to Show Railway Coach Advance

The evolution of the railway coach will be the subject of one of the exhibits at the Rosenwald Industrial museum, which will be located in Jackson Park, Chicago. One coach will be used to show the improvements that have been made during the years. The first section, or compartment, will illustrate a coach of 1825. The succeeding compartments will be replicas of sections in coaches up to the present day, terminating in a modern Pullman compartment. This progression will be realistically produced, even to the bumps and bounces of the first coaches.

## Seven Sons—Seven Railroaders

Mrs. Catherine Gorman, of Champaign, Ill., is the mother of a record railroading family. Phil is agent for the Illinois Central at Evansville, Ind.; Tony is supervising agent for the Indiana division; Adam is chief clerk to the supervisor of bridges and buildings at Champaign; Jack is division valuation clerk at East St. Louis; George is ticket clerk at Champaign; Tom is on leave of absence from the engineering department to attend the University of Illinois. Frank is chief clerk to the assistant general freight and passenger agent of the Big Four at Chicago. All but Tom, the youngest, started as clerks or helpers at the Tolono, Ill., station.

## Presidents Honored

While the colleges were dishing out the annual June sheepskins, they stopped to honor two railway presidents, and the president of a railway supply company. L. A. Downs, of the Illinois Central, received the degree of doctor of engineering from Purdue university, F. W. Sargent, of the Chicago &

North Western, became a doctor of laws at Lawrence college, and Robert F. Carr, of the Dearborn Chemical Company, was made a doctor of laws by the University of Illinois. Mr. Downs is an alumnus of Purdue, and was one of its greatest football players. Mr. Carr is a graduate of Illinois, and has been president of its board of trustees.

## Honoring the Pioneers

Pioneer railroad men, traders, explorers and frontier fighters are to be honored in the car names of the Great Northern's new train from Chicago to the North Pacific coast, the Empire Builder. Separate cars will have such names as John Jacob Astor, who established early trading posts in the Oregon territory; John McLaughlin, who built Fort Vancouver; Alexander Ramsey, an early and famous governor of Minnesota, and soldiers like William Tecumseh Sherman, Phil Sheridan, George A. Custer, Henry Leavenworth, Nelson A. Miles and Wesley Merritt. Names of other pioneers renowned as explorers, fighters and statesmen, as well as various of Mr. Hill's contemporaries, will be used for other cars.

## Train Crew Rouses Burning Village

Another instance of a train crew aiding in saving buildings from destruction by fire occurred recently when the crew of a Norfolk & Western freight train saved the village of Otway, Ohio, in the early morning hours. Conductor C. P. Henry, Brakemen C. B. Keyes and J. S. Little, Engineer E. C. Gleason and Fireman R. Hicks, on that particular morning, noticed that a store in the town was burning, and all hands on the train aided in arousing the inhabitants. The locomotive's whistle awakened Elvin Haxlebaker, another employee of the road who lives at Otway. He at once sounded the village fire bell. The Portsmouth, Ohio, fire department was summoned, and came 20 miles to aid in extinguishing the blaze, which had already destroyed the store and was making headway in a church nearby. It was the quick action of the train crew that saved the village from a fire similar to one in 1913, which levelled 40 buildings.

## What Happens to Old Coaches

The Central of New Jersey conducted a bargain sale recently at Leonardo, N. J., of old passenger coaches, marked down to \$250. A number of them were bought for use as lunch



Central of New Jersey Sells Old Coaches

wagons and bungalows at summer camps. They might have been more appealing to feminine bargain hunters, it seems, if they had been priced at \$249.99, in accordance with the ancient department store tradition.

# NEWS of the WEEK



THE PULLMAN COMPANY, upon the request of the Brazilian railways, has sent representatives to that country to investigate the propriety and economy of operating the sleeping cars of a private company on those lines instead of the cars of the railroads. Whether the Pullman Company will extend its operations to Brazil will depend upon the facts developed by the survey and their effect upon both parties.

MECHANICAL DEPARTMENT FORCES of the Louisville & Nashville and clerks of the Chicago & Alton have been granted wage increases effective July 1. The increases on the Louisville & Nashville, which range from 3 to 5 cents an hour, affect nearly 10,000 employees and involve an increase in the annual payroll of about \$1,000,000. On the Chicago & Alton 850 clerks were granted an increase of 3 cents an hour, making an increase in the annual payroll of about \$65,000.

THE WESTERN REFRIGERATOR LINE COMPANY, Chicago, has been organized to operate refrigerator cars and has entered into an agreement with the Green Bay & Western to handle this company's perishable freight traffic. Officers of the Western Refrigerator Line Company are: President, J. Kibben Ingalls who is also president of the North Western Refrigerator Line Company which operates on the Chicago & North Western; vice-president, E. M. Miller of Green Bay, Wis.; treasurer, Allin K. Inglass, vice-president and treasurer of the North Western Refrigerator Line Company; and secretary Harry E. Kelly, of Chicago. The Western Refrigerator Line Company is now having 500 refrigerator cars built by the American Car & Foundry Company for use in this service.

## A. R. A. Acquires Draft Key Retainer Patent

The rights to United States patent No. 1645817, issued to Karl F. Nystrom, covering the draft key retainer adopted as standard by letter ballot in 1926, have been acquired by the American Railway Association as announced in Circular D.V.-649. According to this circular, all railroads in the United States and all railroads in Canada and Mexico, running

into the United States, also car owners, operating in the United States and car manufacturing companies, may use the construction covered by this patent, free from any royalty or payment of any kind.

## Wage Statistics for April

The number of employees reported to the Interstate Commerce Commission by Class I railways as of the middle of the month of April was 1,665,600, according to the commission's monthly summary of wage statistics. This was an increase of 0.42 per cent as compared with the corresponding month of last year, while the total compensation, \$241,235,474, showed an increase of 4.9 per cent over April, 1928.

## Telegraph Section Meets September 17

W. A. Fairbanks, secretary of the Telegraph and Telephone Section of the American Railway Association, announces that the annual meeting of the Section will be held at Hotel St. Paul, St. Paul, Minn., on Tuesday, Wednesday, Thursday and Friday, September 17, 18, 19 and 20.

## The Northern Alberta

The Northern Alberta, which is made up of the Edmonton, Dunevan & British Columbia, the Central Canada, the Alberta & Great Waterways and the Pembina Valley, was formally turned over to the Canadian National and the Canadian Pacific for joint operation on July 2 by the Alberta government. At that time the provincial government received the first payment for the railways, amounting to \$5,796,300.

## Rock Island Car for Physical Examinations

On the Chicago, Rock Island & Pacific the medical officer who examines employees visits all points on the railroad in a specially constructed car, containing modern equipment. The car, known as "1805", has just been built at the Horton, (Kan.) shops of the railroad, and the necessary equipment has been installed under the direction of Dr. S. C. Pfummer, chief surgeon of that road. The car

contains, besides a reception room, dressing rooms and laboratories, a suite of offices, sleeping quarters for the medical staff, and a complete dining room and kitchen.

Among the employees who will be examined under the program adopted are enginemen, firemen, motormen, conductors, brakemen, yardmasters and assistants, switch tenders and hostlers, signalmen telegraph and telephone operators, police officers, dining car employees and certain classes of shopmen. The physical examinations will include tests for blood pressure, eyesight and color sense, as well as a thorough examination designed to discover incipient diseases.

## Net Income for May Shows Large Increase

Class I railroads in May had a net railway operating income of \$103,616,046, which, for that month, was at the annual rate of return of 5.81 per cent on their property investment, according to reports compiled by the Bureau of Railway Economics. In May, 1928, the net railway operating income was \$88,221,666, or 5.02 per cent.

Operating revenues for the month amounted to \$537,747,535, compared with \$511,511,966 in May, 1928, or an increase of 5.1 per cent; operating expenses \$390,977,050, an increase of 2.3 per cent. Total taxes paid were \$33,661,523 an increase of \$2,757,169 or 8.9 per cent over the same month in 1928. This brought the total tax bill for the five months to \$161,763,466, an increase of \$10,735,583 or 7.1 per cent above that of the corresponding period in 1928.

Twenty-one Class I railroads operated at a loss in May, of which seven were in the Eastern district, two in the Southern and twelve in the Western.

Net railway operating income for 5 months amounted to \$457,362,036, which was at the annual rate of return of 5.60 per cent on the property investment. During the corresponding period of the preceding year, the net was \$376,209,981, or 4.68 per cent.

Operating revenues for five months amounted to \$2,531,371,754, compared with \$2,408,273,320 during the corresponding period in 1928, or an increase of 5.1 per cent. Operating expenses totaled \$1,-



864,233,006, an increase of 1.7 per cent.

Net railway operating income by districts for the first five months with the percentage of return based on property investment on an annual basis was as follows:

New England Region.....	\$19,695,064	5.82%
Great Lakes Region.....	84,969,752	5.51%
Central Eastern Region.....	109,320,633	6.17%
Pocahontas Region.....	34,105,704	9.07%
Total Eastern District.....	\$248,091,153	6.16%
Total Southern District.....	\$58,715,372	4.33%
Northwestern Region.....	\$36,245,425	5.29%
Central Western Region.....	78,754,267	5.92%
Southwestern Region.....	35,555,819	4.65%
Total Western District.....	\$150,555,511	5.42%
United States.....	\$457,362,036	5.60%

Class I railroads in the Eastern district for five months had a net of \$248,091,153, at the annual rate of 6.16 per cent, as compared with \$195,401,156, or 4.93 per cent, in the corresponding period of last year. Operating revenues for five months totaled \$1,273,370,732, an increase of 6.5 per cent over the corresponding period the year before, while operating expenses totaled \$926,140,382, an increase of 2.3 per cent. For May they had a net of \$59,759,148, compared with \$52,018,729 in May, 1928.

Class I railroads in the Southern district for five months had a net of \$58,715,372 at the rate of 4.33 per cent. For the same period in 1928, their net was \$54,876,560, at the rate of 4.12 per cent. Operating revenues in the Southern district for five months amounted to \$331,792,159, an increase of 1.2 per cent over the same period the year before, while operating expenses totaled \$246,637,175 a decrease of six-tenths of one per cent. The net railway in May amounted to \$10,457,111, while in the same month in 1928 it was \$10,733,673.

Class I railroads in the Western district for five months in 1929 had a net railway operating income of \$150,555,511, at the rate of 5.42 per cent. For the first five months in 1928, they had a net of \$125,932,265, which was at the rate of 4.59 per cent. Operating revenues in the Western district for the five months amounted to \$926,208,863, an increase of 4.7 per cent, while operating expenses totaled \$691,455,449, an increase of 1.8 per cent. For May, the net railway operating income in the Western district amounted to \$33,399,787, as compared with \$25,469,264 in May, 1928.

#### CLASS I RAILROADS—UNITED STATES

	Month of May 1929	1928
Total operating revenues.....	\$537,747,535	\$511,511,966
Total operating expenses.....	390,977,050	382,369,709
Taxes.....	33,661,523	30,904,354
Net railway operating income.....	103,616,046	88,221,666
Operating ratio—per cent.....	72.71	74.75
Rate of return on property investment.....	5.81%	5.02%
Five months ended May 31		
Total operating revenues.....	\$2,531,371,754	\$2,408,273,320
Total operating expenses.....	1,864,233,006	1,833,265,235
Taxes.....	161,763,466	151,027,883
Net railway operating income.....	457,362,036	376,209,981
Operating ratio—per cent.....	73.65	76.12
Rate of return on property investment.....	5.60%	4.68%

## Traffic

The Interstate Commerce Commission has extended the effective date of the new rules 1 A and 1 B of its rules of practice, establishing requirements for the admission of attorneys and others to practice before the commission, from July 1 to September 1.

The Sacramento Northern has opened for business its new Holland branch which extends from Riverview, Cal. to Westfield, 15.8 miles. This branch, which cost \$750,000 serves the rich agricultural areas in the Glide, Lisbon and Holland districts of the Sacramento delta region.

Seats in railroad-operated lounge cars at 35 cents are now provided on the Reading's line from Philadelphia to Atlantic City between which points this road runs 15 or more express trains each way every week day. Pullman parlor cars have been taken off these runs.

The Atchison, Topeka & Santa Fe will extend its agricultural development department by establishing an office in Los Angeles, Cal. C. W. Lane, assistant manager of the agricultural department, Topeka, Kan., will be in charge of the Los Angeles office when it opens on September 1. This is the fourth office of the department.

A new record for freight traffic through the St. Louis gateway was established during the first six months of 1929, when 1,468,864 carloads were interchanged compared with 1,319,654 for the same period last year—a gain of 11½ per cent. Every month this year has shown a gain over the corresponding months last year. In June the gain was 26,859 carloads or 12½ per cent.

The Interstate Commerce Commission issued a notice on July 6 saying that the report proposed by the examiners in Part 2 of the rate structure investigation, involving class rates in Western Trunk Line territory, is now being printed and should be ready for service in a few weeks. Copies may be obtained from the Superintendent of Documents, Government Printing Office, at a price which will probably not exceed 25 cents a copy.

The Interstate Commerce Commission has suspended from July 5 until February 5, the operation of schedules as published in Supplement No. 12 to Agent B. T. Jones' I. C. C. No. 2000, Supplement No. 21 to Agent B. T. Jones' I. C. C. No. 2046 and Supplement No. 8 to Missouri Pacific No. A-7390, which propose to increase the proportional rates on grain and grain products, from St. Louis to Central and Eastern points by approximately 2 cents per 100 lb., on grain originating at Western points and transited at St. Louis.

The Great Lakes Regional Advisory Board, reporting a summary of the findings of its commodities committees, estimates that for the current quarter the requirements of shippers in that territory

will call for 4.2 per cent more cars than in the third quarter of 1928. Live hogs have gone up in price so that shipments are expected to be smaller; and live stock as a whole is estimated at 6.5 per cent less than last year. Lumber, etc., also shows a probable decrease of 8.7 per cent, but all other commodities hold their own. The larger increases are: Grain, 15.1 per cent; fresh fruit, except citrus, 10 per cent; potatoes, 15.5 per cent; other fresh vegetables, 10 per cent; coal and coke, 8.5 per cent; salt, 11.2 per cent; cement, 8 per cent; implements, etc., except automobiles, 11.3 per cent; automobiles, 5.2 per cent; fertilizers, 9 per cent; canned goods, 9 per cent.

### Traffic Through Panama Canal

The tolls collected by the Panama Canal during the fiscal year just closed were the highest for any fiscal year since the opening of the canal, according to a statement issued by the War Department, amounting to \$27,127,376, whereas the highest previous total was \$26,944,499 for the fiscal year 1928. The number of transits of commercial vessels during the year was 6413, or slightly less than in 1928 when the number was 6,456. For the six months ended June 30 the number of vessels was 3,226, as compared with 3,149 in the corresponding period of last year, and the tolls collected amounted to \$13,764,081, as compared with \$13,012,667.

### Rates Reduced Through Moffat Tunnel

The Denver & Salt Lake, pursuant to an order of the Public Utilities Commission of Colorado, has filed reduced passenger and freight rates through the Moffat Tunnel, taking effect as of July 1. Passenger fares are reduced about 14 per cent and rates on milk and cream 6.5 per cent. The Commission's order is based on the reduction in distance of 22.84 miles effected by running through the tunnel.

### New North Dakota Freight Rates Protested

A hearing on the petition of North Dakota railroads for an injunction restraining the application of a new tariff of intrastate class freight rates recently placed in effect by the North Dakota Board of Railroad Commissioners was held in the United States district court at St. Paul, Minn. on July 3 before Judges John B. Sanborn of St. Paul, Andrew Miller of Fargo, N. D. and Archibald K. Gardner of Huron, S. D. The new rates, which were to have gone into effect on July 1, would reduce the wholesale distributing rates from all points in the state by about 10 per cent, except those along the eastern border where lower rates than those for cities in the central and western part of the state prevail.

R. J. Hagman, assistant general counsel of the Great Northern, representing the railroads and the Farmers' Grain and Shipping Company of North Dakota, contended that the new schedule would discriminate against Moorhead, Minn. in

(Continued on page 174)

# Revenues and Expenses of Railways

MONTH OF MAY AND FIVE MONTHS OF CALENDAR YEAR 1929

Name of road	Av. mileage operated during period	Operating revenues				Operating expenses				Operating ratio	Net from railway operation	Operating income (or loss)	Net operating income, 1928
		Freight	Passenger	Total	Maintenance of way and structures	Traffic	Transportation	General	Total				
Akron, Canton & Youngstown.....	May 171	\$358,787	\$133	\$358,920	\$26,411	\$14,162	\$83,164	\$21,795	\$183,323	49.3	\$188,707	\$188,707	\$62,722
May 5 mos.	171	1,593,884	679	1,594,563	127,846	68,166	393,773	86,611	888,924	53.9	760,737	760,737	227,463
Atchison, Topeka & Santa Fe.....	May 9,392	12,574,400	2,953,699	15,528,099	3,354,104	4,106,821	4,865,295	462,825	12,408,213	72.0	4,816,362	3,512,076	1,499,872
May 5 mos.	9,392	60,975,407	14,287,689	75,263,096	13,120,489	2,058,836	24,476,432	2,265,477	58,496,978	70.7	24,295,806	17,363,056	10,934,996
Gulf, Colorado & Santa Fe.....	May 1,944	1,608,126	167,167	1,775,293	440,577	57,479	668,352	74,140	1,875,904	97.2	54,842	—38,229	—143,816
May 5 mos.	1,944	9,048,096	845,841	9,893,937	2,669,786	280,230	3,465,465	366,308	8,911,100	84.0	1,699,581	1,246,547	408,140
Panhandle & Santa Fe.....	May 1,104	849,147	93,983	943,130	219,884	12,157	293,997	27,123	863,013	84.6	1,556,913	119,319	34,880
May 5 mos.	1,040	4,306,105	447,385	4,753,490	1,221,117	60,197	1,499,973	134,216	3,852,385	75.4	1,253,614	1,032,407	679,111
Atlanta & West Point.....	May 93	159,279	47,718	206,997	31,639	12,497	95,866	12,363	202,815	84.6	36,915	19,966	7,272
May 5 mos.	93	801,176	239,344	1,040,520	213,907	62,391	473,883	69,559	987,581	81.9	223,425	151,907	149,361
Western of Alabama.....	May 133	163,635	31,010	194,645	39,484	12,251	47,368	13,114	197,251	81.9	43,721	25,066	85,526
May 5 mos.	133	862,694	258,679	1,121,373	223,361	63,797	428,613	70,761	1,061,455	84.1	200,315	126,965	396,064
Atlanta, Birmingham & Coast.....	May 639	310,564	18,834	329,398	91,151	29,742	152,005	19,482	394,471	104.8	—18,232	—35,175	—43,666
May 5 mos.	639	1,589,712	97,910	1,687,622	442,229	142,962	777,281	94,253	1,925,790	101.2	—24,933	—108,404	—131,534
Atlantic Coast Line.....	May 5,152	5,392,381	849,472	6,241,853	978,616	178,252	2,206,780	184,258	4,862,456	70.8	2,001,712	1,400,051	1,246,403
May 5 mos.	5,149	26,777,222	7,149,569	33,926,791	4,440,411	845,132	11,281,931	893,037	23,539,913	63.4	13,578,590	10,318,373	9,670,374
Charleston & Western Carolina.....	May 342	253,022	9,327	262,349	41,063	7,691	94,631	6,648	213,602	77.9	60,577	34,061	24,784
May 5 mos.	342	1,338,354	48,586	1,386,940	311,329	35,276	499,194	33,586	1,069,478	74.1	373,996	256,471	238,363
Baltimore & Ohio.....	May 5,639	18,438,117	1,904,053	20,342,170	2,328,713	472,956	7,076,884	730,032	13,446,978	71.0	6,308,908	5,282,321	4,961,902
May 5 mos.	5,639	82,486,527	8,978,896	91,465,423	11,643,677	2,460,038	34,400,071	3,426,999	73,992,490	75.5	24,019,788	18,871,636	17,702,763
Baltimore & Ohio Chi. Term.....	May 82	.....	.....	.....	.....	2,595	189,472	20,506	303,387	71.8	119,318	51,233	151,333
May 5 mos.	82	.....	.....	.....	.....	11,731	921,607	90,035	1,500,759	83.6	293,810	—8,123	490,828
Staten Island Rapid Transit.....	May 23	119,209	137,198	256,407	38,512	10,430	15,129	15,129	178,863	66.1	91,881	74,881	37,025
May 5 mos.	23	597,859	597,859	1,195,718	154,096	10,431	530,311	77,022	864,257	73.4	313,858	224,847	48,169
Bangor & Aroostook.....	May 619	519,422	35,659	555,081	111,096	6,417	143,061	25,229	406,818	69.8	175,935	128,945	149,702
May 5 mos.	619	3,257,360	293,577	3,550,937	585,100	30,985	887,816	142,899	2,178,047	59.1	1,504,707	1,206,342	1,198,956
Belt Ry. Co. of Chicago.....	May 48	.....	.....	.....	82,457	7,731	304,389	16,040	480,542	69.9	206,447	144,342	147,396
May 5 mos.	48	.....	.....	.....	334,005	19,615	1,593,600	80,413	2,411,194	72.2	929,338	654,523	751,623
Bessemer & Lake Erie.....	May 227	2,071,173	7,591	2,078,764	146,027	17,133	380,061	36,068	903,572	42.9	1,203,258	1,042,337	1,058,008
May 5 mos.	227	5,274,502	39,135	5,313,637	1,601,578	73,688	1,433,932	178,470	3,740,946	68.9	1,686,404	1,395,156	1,594,597
Bingham & Garfield.....	May 33	47,243	.....	47,243	8,267	1,423	10,036	4,613	26,365	52.5	23,826	14,443	10,276
May 5 mos.	33	225,619	.....	225,619	19,924	7,967	52,110	22,264	137,910	57.9	100,223	19,074	31,412
Boston & Maine.....	May 2,077	4,554,651	1,165,375	5,720,026	1,153,384	87,357	2,190,135	210,483	4,933,313	75.0	1,645,037	1,326,835	1,061,939
May 5 mos.	2,077	20,867,267	6,374,096	27,241,363	5,637,147	445,367	11,238,120	1,085,063	23,490,917	75.1	7,789,599	6,240,917	5,173,300
Brooklyn Eastern Dist. Term.....	May 11	593,643	.....	593,643	14,802	617	42,624	6,746	77,534	59.5	52,739	44,784	42,526
May 5 mos.	11	.....	.....	.....	60,173	3,757	210,998	33,232	355,670	58.6	251,093	211,031	207,643
Buffalo & Susquehanna.....	May 253	136,396	823	137,219	52,221	1,772	44,867	7,904	136,876	93.6	9,411	7,311	21,496
May 5 mos.	253	713,913	5,538	719,451	141,892	9,249	244,077	39,413	671,357	87.3	97,350	105,943	187,657
Buffalo, Rochester & Pittsburgh.....	May 601	1,444,810	60,672	1,505,482	196,659	33,524	533,394	43,614	1,259,894	80.9	296,816	246,707	273,111
May 5 mos.	601	6,559,232	345,458	6,904,690	708,218	164,981	2,621,892	226,384	5,790,217	81.2	1,342,938	1,132,628	1,236,226
Canadian Pacific Lines in Maine.....	May 233	124,813	22,492	147,305	109,793	7,385	75,889	3,508	230,392	144.1	—70,540	—85,040	—114,637
May 5 mos.	233	1,666,299	168,040	1,834,339	313,320	33,649	689,856	20,319	1,339,253	85.0	239,464	166,964	21,898
Canadian Pacific Lines in Vermont.....	May 85	118,209	24,283	142,492	50,718	1,944	95,872	2,386	183,201	101.1	—16,887	—20,907	—33,954
May 5 mos.	85	580,424	159,040	739,464	183,046	9,038	481,487	11,712	853,856	100.9	—7,555	—27,655	—188,049
Central of Georgia.....	May 1,943	1,553,120	235,030	1,788,150	276,562	82,690	880,887	90,864	1,642,164	79.3	428,253	311,408	325,684
May 5 mos.	1,944	7,867,766	1,580,631	9,448,397	1,807,248	353,621	3,932,224	444,597	8,049,178	76.2	2,515,862	1,874,069	1,867,967
Central of New Jersey.....	May 690	3,942,505	689,757	4,632,262	499,218	54,568	1,865,888	132,839	3,617,416	72.8	1,354,074	800,078	663,318
May 5 mos.	690	18,458,280	3,306,996	21,765,276	2,190,792	289,556	9,016,504	655,262	17,607,761	75.4	5,740,818	3,990,492	3,621,563
Central Vermont.....	May 413	625,341	70,675	696,016	94,321	17,196	296,848	25,966	673,330	85.9	110,208	94,024	96,752
May 5 mos.	413	2,674,853	468,572	3,143,425	578,018	86,581	1,454,555	124,681	2,717,571	78.4	752,459	671,550	700,430
Chesapeake & Ohio.....	May 2,730	9,737,370	340,674	10,078,044	2,390,226	142,146	2,672,218	287,707	7,066,375	65.7	3,691,492	2,989,384	3,186,302
May 5 mos.	2,730	46,917,993	2,622,854	49,540,847	7,698,216	675,290	13,411,959	1,405,545	35,073,160	68.0	16,513,337	13,038,617	13,955,507
Chicago & Alton.....	May 1,028	1,626,527	453,006	2,079,533	353,022	75,354	872,521	63,835	1,962,937	78.1	379,921	264,728	74,216
May 5 mos.	1,028	8,110,641	2,283,431	10,394,072	2,668,918	378,367	4,411,883	308,723	9,056,256	83.8	2,541,903	1,994,469	1,336,191
Chicago & Eastern Illinois.....	May 946	1,542,010	258,760	1,800,770	271,277	85,033	755,156	69,860	1,644,014	82.6	345,350	214,352	59,542
May 5 mos.	946	7,868,267	1,372,790	9,241,057	1,240,108	415,216	3,946,986	353,209	8,169,919	80.6	1,968,065	1,343,144	597,798
Chicago & Illinois Midland.....	May 131	111,936	5,034	116,970	36,728	19,558	70,548	18,934	198,920	88.7	25,341	17,406	19,434
May 5 mos.	131	1,157,927	31,924	1,189,851	159,107	92,961	347,353	92,500	964,713	78.7	261,503	221,828	217,457
Chicago & North Western.....	May 8,466	9,739,386	1,843,915	11,583,301	1,961,350	214,963	4,726,041	382,553	9,866,111	75.2	3,256,656	2,478,930	2,320,552
May 5 mos.	8,466	42,413,866	9,488,644	51,902,510	11,999,715	1,013,151	23,581,953	1,887,804	46,777,364	80.0	11,712,709	7,829,880	6,847,232
Chicago, Burlington & Quincy.....	May 9,374	9,703,440	1,422,697	11,126,137	2,694,753	342,064	4,190,078	378,634	9,934,804	79.2	2,603,101	1,763,106	1,559,921
May 5 mos.	9,374	50,001,908	7,067,908	57,069,816	9,898,294	1,378,255	21,405,794	1,862,221	42,865,103	67.2	20,886,103	15,475,351	14,469,882



# Revenues and Expenses of Railways

MONTH OF MAY AND FIVE MONTHS OF CALENDAR YEAR 1929—CONTINUED

Name of road	Av. mileage operated during period	Operating revenues			Operating expenses			General	Total	Operating ratio	Net from railway operation	Operating income (or loss)	Net operating income	Net operating income, 1928
		Freight	Passenger (inc. misc.)	Total	Maintenance of way and structures	Traffic	Trans- portation							
Chicago Great Western	1,495	\$1,690,830	\$212,113	\$2,083,372	\$320,145	\$87,642	\$851,107	\$57,294	\$1,718,856	82.4	\$366,516	\$87,948	\$133,334	\$141,738
Chicago, Indianapolis & Louisville	1,495	7,953,488	1,171,123	9,961,622	1,180,609	410,361	4,411,438	291,761	8,227,783	82.6	1,734,585	478,000	478,000	614,379
Chicago, Indianapolis & Louisville	650	1,212,887	216,072	1,616,352	130,687	45,997	545,300	36,664	1,125,855	69.7	490,497	401,562	259,028	225,822
Chicago, Indianapolis & Louisville	650	5,812,175	836,566	7,434,827	699,978	201,889	2,743,144	185,372	5,466,646	73.5	1,968,181	1,549,826	897,825	963,026
Chicago, Mil., St. Paul & Pacific	11,247	11,543,500	1,271,770	14,263,998	2,898,055	325,538	4,871,775	373,479	11,202,455	78.5	3,061,543	2,270,229	1,821,949	1,850,162
Chicago, Mil., St. Paul & Pacific	11,250	52,989,651	6,640,797	66,298,969	9,469,210	1,531,343	25,171,721	1,873,269	51,346,259	77.4	14,952,710	10,946,112	8,538,068	10,259,337
Chicago River & Indiana	20	.....	.....	594,465	48,552	637	214,042	15,064	330,693	55.6	263,772	223,556	310,204	273,221
Chicago River & Indiana	20	.....	.....	2,898,084	230,110	3,196	1,071,474	7,139	1,648,371	56.9	1,249,713	1,046,490	1,469,554	1,361,298
Chicago, Rock Island & Pacific	7,564	8,278,326	1,506,335	10,876,238	1,716,030	273,300	4,009,681	355,903	8,721,654	80.2	2,154,584	1,477,253	1,077,172	1,133,909
Chicago, Rock Island & Pacific	7,564	41,979,990	7,774,360	54,882,657	7,422,002	1,248,214	20,706,332	1,779,619	42,944,643	78.2	11,938,014	8,457,002	6,284,196	6,884,738
Chicago, Rock Island & Gulf	550	4,596,591	58,502	5,724,464	77,319	66,383	20,709	17,590	391,780	68.4	180,684	153,606	110,193	47,322
Chicago, Rock Island & Gulf	523	2,401,791	327,256	2,985,535	321,096	102,758	986,994	95,065	1,817,247	60.9	1,168,288	1,042,072	867,540	564,257
Chic., St. Paul, Minn. & Omaha	1,746	1,594,991	287,122	2,079,951	322,453	41,690	873,893	81,096	1,716,356	82.5	363,595	261,437	210,854	60,974
Clinchfield	309	7,731,062	1,627,441	10,212,028	1,340,826	195,616	4,735,581	406,520	8,670,952	84.9	1,546,076	1,009,233	706,383	759,524
Clinchfield	309	534,447	13,335	561,086	70,591	148,531	24,226	17,231	379,828	67.7	181,258	106,241	141,492	201,390
Clinchfield	309	2,850,190	69,621	2,982,354	313,800	726,435	609,408	92,175	1,853,898	62.2	1,128,456	753,347	1,170,898	1,134,736
Colorado & Southern	1,035	776,597	78,879	956,596	204,766	239,663	330,461	42,467	835,785	87.4	120,811	52,410	30,323	62,104
Colorado & Southern	1,035	3,920,494	403,087	4,750,295	655,007	1,042,053	76,001	213,068	3,708,719	78.1	1,041,576	687,191	583,311	379,497
Ft. Worth & Denver City	696	1,199,169	129,018	1,829,752	158,564	181,691	281,627	40,280	691,326	83.3	138,426	107,789	101,226	227,430
Ft. Worth & Denver City	696	3,519,535	643,781	4,497,978	618,209	110,461	1,429,628	200,806	3,160,520	70.3	1,337,458	1,087,062	1,046,931	1,118,971
Wichita Valley	271	75,699	9,373	91,663	26,932	6,809	36,010	1,700	70,602	77.0	21,061	14,221	—9,449	6,048
Wichita Valley	271	507,985	44,334	582,277	80,240	40,896	194,875	8,487	351,517	60.4	230,760	192,969	86,737	193,235
Columbus & Greenville	167	118,694	14,348	140,951	32,558	15,371	51,592	11,757	115,720	82.1	25,231	20,654	—5,409	20,062
Columbus & Greenville	167	614,061	81,605	737,102	178,959	89,995	268,331	59,736	616,033	83.6	121,069	104,768	46,435	—
Conemaugh & Black Lick	23	134,626	.....	220,420	18,006	27,622	106,385	3,462	156,400	71.0	64,020	63,020	61,014	18,836
Conemaugh & Black Lick	23	416,120	827,229	73,673	144,110	2,464	478,720	16,749	715,746	86.5	111,483	106,483	98,703	13,338
Delaware & Hudson	881	3,129,458	199,652	3,570,222	392,084	82,576	88,827	164,247	2,716,281	76.1	833,741	764,241	759,575	1,147,931
Delaware & Hudson	881	14,233,238	1,183,819	16,536,321	2,016,933	4,034,129	6,263,111	812,799	13,432,749	81.2	3,103,572	2,657,915	2,638,859	2,312,394
Delaware, Lackawanna & Western	998	5,566,555	875,172	7,323,752	870,906	1,100,914	2,695,645	177,789	5,240,866	71.5	2,084,886	1,483,753	1,483,728	1,430,092
Delaware, Lackawanna & Western	998	25,346,187	4,300,728	33,856,022	3,171,754	6,551,541	13,385,390	897,789	24,478,152	72.3	9,377,870	6,547,382	6,572,551	5,572,551
Denver & Rio Grande Western	2,563	2,124,785	235,851	2,561,310	485,627	71,040	731,269	92,296	1,961,620	72.6	509,690	432,463	511,581	286,089
Denver & Rio Grande Western	2,551	10,655,472	1,136,024	12,730,612	1,977,150	2,639,970	3,830,122	450,498	9,334,737	73.3	3,395,875	2,528,383	2,903,878	2,005,456
Denver & Salt Lake	332	192,181	19,172	229,145	113,069	59,837	1,791	14,944	228,615	99.8	530	—9,470	2,217	101,785
Denver & Salt Lake	332	2,281,013	97,195	2,458,426	253,704	9,737	242,920	62,030	2,391,345	62.7	547,081	497,062	537,235	518,482
Detroit & Mackinac	300	1,161,649	81,128	1,242,777	144,871	31,248	42,117	8,013	113,963	75.8	39,329	41,319	43,878	14,303
Detroit & Mackinac	300	500,344	53,650	597,477	109,333	155,088	206,975	31,536	500,056	86.2	97,421	60,567	71,896	43,032
Detroit & Toledo Shore Line	50	419,479	.....	426,473	55,845	33,858	101,660	25,726	266,624	62.5	159,849	124,371	54,997	75,502
Detroit & Toledo Shore Line	50	2,335,913	.....	2,374,433	187,131	183,874	122,117	77,134	1,120,860	47.1	1,256,783	1,067,019	586,044	571,155
Detroit Terminal	50	.....	.....	25,733	21,362	.....	100,210	4,315	155,692	60.4	100,641	79,562	80,136	78,232
Detroit Terminal	50	.....	.....	1,247,782	112,566	.....	531,027	22,380	776,396	62.2	471,386	363,898	369,167	237,835
Detroit, Toledo & Iron Range	495	1,223,529	3,042	1,255,131	180,755	12,125	287,330	28,954	638,536	52.5	596,595	535,341	441,876	193,384
Detroit, Toledo & Iron Range	495	6,223,948	15,416	6,239,364	689,781	62,517	1,482,794	144,827	3,177,071	49.9	3,194,684	2,815,193	2,322,977	580,574
Duluth & Iron Range	269	910,311	2,854	1,041,128	176,908	1,715	188,732	21,772	505,221	48.5	535,907	500,845	501,596	226,506
Duluth & Iron Range	269	1,498,180	24,592	1,742,233	440,674	566,491	8,202	108,070	1,691,261	97.1	50,972	—78,600	—558,725	—
Duluth, Missabe & Northern	307	2,757,660	3,661	3,133,806	193,886	182,159	422,486	24,414	825,734	26.3	2,308,072	2,039,396	2,033,653	992,667
Duluth, Missabe & Northern	307	3,810,820	20,199	4,355,710	570,977	15,049	1,021,788	11,871	2,113,552	60.6	1,715,644	1,009,060	994,647	587,942
Duluth, Winnipeg & Pacific	178	193,550	10,228	217,483	80,014	41,971	72,118	8,270	211,352	97.2	15,415	13,176	8,707	8,707
Duluth, Winnipeg & Pacific	178	934,836	60,702	1,037,722	202,449	196,841	370,818	40,893	848,677	81.8	189,043	136,145	142,334	155,734
Elgin, Joliet & Eastern	453	2,234,099	18	2,234,099	228,387	405,815	775,986	53,413	1,477,965	60.3	972,663	841,514	624,550	443,269
Elgin, Joliet & Eastern	453	10,184,115	43	11,195,340	947,265	76,194	3,895,693	260,698	7,103,767	63.4	4,091,571	3,461,650	2,452,810	2,142,941
Erie Railroad	2,047	8,556,385	816,052	10,090,736	1,239,699	2,011,444	3,590,700	302,253	7,118,484	76.5	2,372,252	1,862,859	1,893,974	1,991,539
Erie Railroad	2,047	38,552,135	3,937,831	46,301,912	4,930,912	889,423	17,723,391	1,300,592	36,114,669	78.0	10,187,243	7,971,147	7,683,435	6,081,386
Chicago & Erie	269	1,128,886	45,551	1,279,207	186,079	31,760	354,456	42,414	738,162	58.5	531,043	474,650	198,953	235,505
Chicago & Erie	269	5,785,554	203,981	6,500,889	686,039	145,763	1,821,798	210,272	3,532,219	54.3	2,968,271	2,686,717	1,224,816	445,555
New Jersey & New York	45	137,961	469,029	634,043	75,320	123,303	351,397	18,206	576,968	91.0	57,075	36,519	—126,176	—
N. Y., Susquehanna & Western	131	360,450	45,187	434,808	54,991	53,022	191,136	12,732	311,631	71.7	123,177	92,124	58,595	108,208
N. Y., Susquehanna & Western	131	1,730,790	210,109	2,117,192	246,254	262,361	965,663	59,393	1,560,044	73.7	557,148	401,339	272,216	131,760
Evansville, Indianapolis & Terre Haute	146	133,841	3,112	145,152	27,005	20,297	73,050	4,860	107,284	73.9	37,868	32,909	6,091	—5,176
Evansville, Indianapolis & Terre Haute	146	870,496	17,674	890,496	115,628	107,851	299,460	26,211	558,877	64.2	311,619	286,068	108,911	45,186
Florida East Coast	853	712,870	218,640	1,080,122	137,745	182,065	328,109	47,161	740,326	68.5	339,796	193,095	107,296	578,203
Florida East Coast	853	4,046,808	2,762,370	7,793,838	815,411	913,961	1,940,948	215,487	4,223,288	54.2	3,572,550	2,854,701	2,456,037	1,926,169

# Revenues and Expenses of Railways

MONTH OF MAY AND FIVE MONTHS OF CALENDAR YEAR 1929—(CONTINUED)

Name of road	Av. mileage operated during period	Operating revenues			Operating expenses			Operating ratio	Net from railway operation	Operating income (or loss)	Net ry. operating income, 1928
		Freight	Passenger (inc. misc.)	Total	Maintenance of way and structures	Equip. ment.	Traffic				
Fort Smith & Western.....	249	\$80,897	\$8,243	\$89,140	\$24,636	\$21,939	\$34,452	96.3	\$3,570	-\$1,155	-\$12,459
Galveston Wharf.....	249	508,927	45,098	554,025	119,450	125,331	204,998	86.6	79,687	36,037	29,078
Georgia R. R. ....	13	.....	.....	.....	33,994	5,074	32,015	76.5	32,201	15,201	61,499
Georgia R. R. ....	13	.....	.....	.....	210,599	26,800	161,694	61.9	327,668	242,668	151,801
Georgia R. R. ....	328	361,759	46,830	408,589	56,147	80,937	182,108	82.5	77,582	62,068	42,129
Georgia & Florida.....	328	1,779,944	258,926	2,038,870	244,232	418,669	924,229	82.5	386,432	385,423	302,758
Georgia & Florida.....	444	99,363	9,238	108,601	26,801	28,845	53,646	97.7	2,913	-6,814	5,841
Georgia & Florida.....	444	547,779	46,280	594,059	131,719	109,581	275,926	92.9	45,983	-2,589	69,444
Grand Trunk Western.....	345	1,662,457	155,046	1,817,503	431,542	396,286	660,629	81.8	351,852	258,127	133,195
Atlantic & St. Lawrence.....	345	8,300,167	777,807	9,077,974	1,442,669	1,899,724	3,234,396	71.8	2,690,051	2,227,599	1,641,600
Atlantic & St. Lawrence.....	166	150,989	21,658	172,647	87,484	87,229	174,713	121.2	-41,374	-50,034	-104,091
Atlantic & St. Lawrence.....	166	701,530	129,112	830,642	255,272	218,209	492,661	112.0	-112,167	-19,510	-457,789
Chic., Det. & Canada Gr. Tr. Jct.....	59	345,208	651	345,859	20,029	16,271	50,558	35.8	253,322	242,060	220,859
Detroit, Grand Haven & Mil.....	59	1,539,778	3,320	1,543,098	94,265	80,896	24,345	40.6	1,056,597	1,000,934	845,711
Detroit, Grand Haven & Mil.....	192	802,768	16,213	818,981	82,878	67,798	15,174	54.1	400,220	385,270	256,208
Detroit, Grand Haven & Mil.....	192	3,551,684	118,738	3,670,422	300,470	326,347	1,481,242	57.5	1,671,467	1,608,423	804,083
Great Northern.....	8,399	9,169,386	770,604	9,940,000	2,225,354	1,616,084	266,205	68.3	3,486,395	2,737,567	2,744,479
Green Bay & Western.....	8,403	35,380,928	4,181,725	39,562,653	7,214,596	8,438,025	1,297,989	74.5	11,503,422	8,011,498	7,876,945
Green Bay & Western.....	234	185,111	2,848	187,959	27,797	27,448	68,492	69.5	59,424	50,424	38,610
Green Bay & Western.....	234	730,804	28,967	759,771	124,344	119,093	30,398	79.4	161,230	121,182	97,599
Gulf & Ship Island.....	307	198,875	25,765	224,640	61,273	48,605	98,764	91.9	19,786	-11,904	-14,030
Gulf, Mobile & Northern.....	307	1,066,722	186,268	1,252,990	276,819	243,435	547,243	82.7	240,003	80,692	3,730
Gulf, Mobile & Northern.....	733	557,937	24,341	582,278	89,016	102,242	190,905	72.6	167,376	126,724	89,854
Gulf, Mobile & Northern.....	733	2,768,976	124,629	2,893,605	467,126	487,803	1,607,730	72.1	844,310	638,899	474,694
Hocking Valley.....	348	1,494,059	51,339	1,545,398	193,398	342,165	474,041	64.1	685,401	561,354	478,508
Hocking Valley.....	348	7,205,323	278,607	7,483,930	1,046,237	1,572,067	2,253,991	61.0	2,902,071	2,256,573	2,034,102
Hocking Valley.....	348	9,702,879	1,571,368	11,274,247	1,670,767	3,063,220	2,699,938	79.9	2,518,470	1,717,487	1,717,487
Illinois Central.....	5,035	49,715,160	9,006,005	58,721,165	7,188,389	14,573,078	1,324,452	75.9	15,431,502	11,028,612	10,697,018
Yazoo & Mississippi Valley.....	1,705	1,697,477	231,062	1,928,539	413,417	410,367	828,775	85.5	302,421	132,216	64,032
Illinois Central System.....	1,705	8,628,616	1,212,027	9,840,643	1,822,685	2,020,122	4,262,594	82.1	1,891,340	1,039,021	663,054
Illinois Central System.....	6,740	11,413,360	1,805,583	13,218,943	2,084,184	3,481,897	5,405,498	80.7	8,290,172	6,817,408	1,711,117
Illinois Central System.....	6,740	58,407,437	10,234,737	68,642,174	9,011,074	16,621,307	15,466,654	76.8	17,329,778	12,069,989	11,362,428
Illinois Terminal.....	473	477,592	128,804	606,396	74,408	85,644	201,272	65.38	219,694	198,393	158,772
Kansas City, Mexico & Orient.....	473	2,066,812	684,862	2,751,674	355,227	453,976	1,025,086	70.44	892,881	786,408	586,828
Kansas City, Mexico & Orient.....	272	1,666,891	180,385	1,847,276	313,319	313,319	484,961	86.1	24,699	-17,951	1,502
Kansas City, Mexico & Orient.....	272	743,509	23,548	767,057	295,080	192,458	284,991	106.0	-48,073	-119,125	170,625
Kansas City, Mex. & Orient of Tex.....	465	319,519	13,325	332,844	89,270	41,397	67,088	68.7	108,854	160,904	121,710
Kansas City Southern.....	465	1,347,644	60,433	1,408,077	407,725	238,500	38,291	75.7	360,212	376,335	123,788
Kansas City Southern.....	784	1,345,596	83,558	1,429,154	195,067	260,523	468,674	66.1	552,203	434,607	368,233
Kansas City Southern.....	784	6,373,254	403,796	6,777,050	945,208	1,249,110	2,309,349	69.0	2,330,703	1,762,172	1,456,027
Texas & Ft. Smith.....	81	229,323	6,482	235,805	30,046	28,637	7,318	54.2	117,183	100,113	70,314
Kansas, Oklahoma & Gulf.....	81	1,176,949	32,390	1,209,339	115,972	119,744	35,835	48.7	607,959	575,198	412,541
Kansas, Oklahoma & Gulf.....	326	303,847	2,643	306,490	33,775	20,130	14,197	46.6	106,652	146,982	137,692
Kansas, Oklahoma & Gulf.....	326	1,441,060	403,796	1,844,856	183,446	139,620	69,029	52.2	707,227	607,092	251,769
Lake Superior & Ishpeming.....	160	373,918	608	374,526	46,559	24,736	75,444	37.3	272,621	230,694	229,845
Lake Terminal.....	160	797,262	7,324	804,586	130,438	132,838	238,835	62.4	341,440	247,635	226,948
Lake Terminal.....	13	.....	.....	.....	131,040	13,466	58,336	64.9	35,744	41,324	5,406
Lake Terminal.....	13	.....	.....	.....	61,311	79,004	237,349	91.6	35,744	11,324	19,849
Lehigh & Hudson River.....	96	202,813	1,011	203,824	29,584	32,124	73,871	69.2	65,798	52,104	33,637
Lehigh & Hudson River.....	96	1,007,749	5,652	1,013,401	157,094	157,094	380,206	71.3	304,053	325,420	130,098
Lehigh & Hudson River.....	216	453,424	994	454,418	62,043	89,681	148,211	69.8	139,389	119,856	123,385
Lehigh & Hudson River.....	216	1,904,338	5,183	1,909,521	234,869	465,776	704,961	78.7	412,253	349,940	338,374
Lehigh Valley.....	1,361	5,322,308	515,435	5,837,743	560,955	1,182,061	1,471,755	70.4	1,894,794	1,541,993	1,619,879
Louisiana & Arkansas.....	1,361	24,141,904	2,523,311	26,665,215	6,274,923	6,274,923	11,899,723	75.6	7,081,221	5,224,757	4,810,799
Louisiana & Arkansas.....	636	556,367	18,943	575,310	118,180	91,850	24,347	72.8	163,109	120,092	74,400
Louisiana & Arkansas.....	636	2,919,176	90,961	3,010,137	335,984	435,977	966,941	69.8	942,407	689,768	473,577
Louisiana Ry. & Nav. Co.....	206	78,713	1,941	80,654	17,006	17,006	36,135	98.8	1,044	-4,026	-16,549
Louisiana Ry. & Nav. Co. of Texas, May.....	206	376,999	12,063	389,062	123,848	71,778	197,112	95.3	-19,805	-43,985	-131,481



# Revenues and Expenses of Railways

MONTH OF MAY AND FIVE MONTHS OF CALENDAR YEAR 1929—CONTINUED

Name of road	Av. mileage operated during period	Operating revenues			Operating expenses			Operating income (or loss)	Net operating income	Net operating income 1928
		Freight	Passenger (inc. misc.)	Total	Way and structures	Maintenance of equipment	Traffic			
Louisville & Nashville	5 mos.	\$9,093,711	\$1,213,585	\$11,069,507	\$1,865,692	\$2,602,689	\$2,683,842	\$8,960,497	\$1,515,095	\$1,516,388
Louisville & Nashville	5 mos.	43,891,768	6,478,945	54,138,296	8,921,403	12,539,296	12,835,228	43,966,247	7,264,084	8,452,223
Louisville, Henderson & St. Louis	5 mos.	170,000	40,766	258,212	60,670	43,289	9,927	241,722	1,766	1,766
Louisville, Henderson & St. Louis	5 mos.	954,686	183,041	1,253,250	240,959	239,732	547,353	1,140,186	63,497	105,900
Maine Central	1,122	1,209,475	213,307	1,593,681	278,778	304,961	18,201	1,240,017	250,671	210,631
Maine Central	5 mos.	5,791,821	1,176,325	7,695,698	1,116,345	1,472,210	84,315	5,979,264	1,115,582	1,110,697
Midland Valley	364	246,211	11,742	266,963	60,362	29,559	6,767	177,827	54,098	55,478
Midland Valley	5 mos.	1,306,238	60,212	1,411,695	242,468	139,828	33,744	842,694	385,059	357,585
Minneapolis & St. Louis	1,627	923,566	64,269	1,064,707	231,068	155,126	35,375	972,648	29,730	—200,639
Minneapolis & St. Louis	5 mos.	4,877,409	377,264	5,582,419	803,249	1,022,540	180,712	4,938,891	55,334	—278,420
Minneapolis, St. Paul & S. M. R.	4,380	3,720,642	289,416	4,363,410	570,671	768,010	86,079	3,007,415	965,494	438,861
Minneapolis, St. Paul & S. M. R.	5 mos.	15,043,625	1,691,087	18,129,925	2,360,867	3,681,156	387,166	14,278,200	2,671,358	1,470,186
Duluth, South Shore & Atlantic	573	354,856	41,556	439,109	99,560	70,873	8,480	362,403	45,706	—11,554
Duluth, South Shore & Atlantic	5 mos.	1,641,306	268,535	2,054,992	310,485	348,216	27,186	1,669,235	226,755	140,562
Spokane International	165	77,696	7,045	92,023	16,103	9,303	3,695	66,312	20,246	14,184
Spokane International	5 mos.	364,429	42,490	487,376	87,271	46,787	17,683	368,699	91,356	59,637
Mississippi Central	161	125,795	6,390	137,482	20,125	26,475	10,049	100,679	26,736	29,785
Mississippi Central	5 mos.	631,180	30,691	686,247	93,133	122,745	47,408	488,232	148,035	146,985
Missouri & North Arkansas	364	129,347	9,860	150,965	29,546	29,114	9,798	134,287	16,720	1,019
Missouri & North Arkansas	5 mos.	654,812	50,761	754,089	160,091	121,691	47,939	676,839	63,028	—28,160
Missouri-Kansas-Texas Lines	3,188	3,365,496	540,408	4,303,902	723,524	870,611	130,159	3,273,063	791,953	590,817
Missouri-Kansas-Texas Lines	5 mos.	17,461,200	2,661,486	21,983,331	2,901,622	4,478,242	611,581	15,752,695	4,915,529	3,890,169
Missouri Pacific	7,461	8,832,471	1,004,423	10,913,253	1,936,177	2,059,261	337,879	8,785,354	1,423,553	1,313,901
Missouri Pacific	5 mos.	44,666,008	5,353,757	54,506,110	8,573,018	10,168,045	1,534,241	41,651,796	10,460,360	7,284,130
Gulf Coast Lines	1,026	1,095,813	122,942	1,314,091	233,475	226,949	45,701	949,697	364,394	226,807
Gulf Coast Lines	5 mos.	5,960,515	673,964	7,033,104	1,164,724	1,772,583	225,088	4,943,206	1,812,377	1,217,763
International-Great Northern	1,159	1,174,706	166,253	1,484,179	247,256	237,218	41,835	1,204,997	237,210	142,902
International-Great Northern	5 mos.	6,036,584	853,963	7,086,979	1,237,650	1,281,522	186,405	6,163,498	1,233,666	644,721
San Antonio, Uvalde & Gulf	318	145,565	18,963	179,666	40,179	22,714	7,121	129,105	46,199	20,238
San Antonio, Uvalde & Gulf	5 mos.	782,329	87,378	987,608	195,695	182,327	35,512	639,616	297,992	135,772
Texas & Pacific	2,015	3,183,273	463,703	3,914,503	643,626	695,287	99,261	2,785,686	976,832	667,024
Texas & Pacific	5 mos.	15,624,299	2,260,716	19,122,055	2,937,273	3,308,894	437,310	13,449,344	3,295,263	4,117,107
Mobile & Ohio	1,159	1,288,285	79,151	1,462,203	242,104	283,624	60,938	1,158,889	303,314	177,415
Mobile & Ohio	5 mos.	6,355,817	406,573	7,176,209	1,071,393	1,352,735	285,313	5,887,866	1,165,039	912,401
Monongahela	171	641,992	9,534	656,761	80,000	75,000	1,017	324,691	303,536	137,573
Monongahela	5 mos.	3,025,134	55,581	3,106,301	400,000	375,000	5,593	1,631,663	1,352,860	844,359
Monongahela Connecting	6	246,477	32,827	282,827	41,540	300	98,921	177,432	56,063	53,037
Monongahela Connecting	5 mos.	1,093,342	14,265	1,107,607	170,943	150	468,860	777,726	261,368	136,610
Montour	56	219,525	220,656	440,181	34,350	56,981	1,380	185,713	73,071	83,565
Montour	5 mos.	843,874	846,487	1,690,361	108,308	235,731	6,362	587,451	231,164	304,807
Nashville, Chatt. & St. Louis	1,222	1,533,721	228,949	1,950,900	392,791	671,448	83,195	1,484,619	371,197	346,349
Nashville, Chatt. & St. Louis	5 mos.	7,622,612	1,300,223	9,899,976	1,154,143	1,910,479	421,205	7,353,782	2,064,716	2,067,432
Nevada Northern	165	111,827	6,064	132,126	12,037	7,401	1,049	44,131	73,613	70,677
Nevada Northern	5 mos.	500,502	33,390	597,133	60,846	33,051	4,919	216,990	306,989	297,831
Newburgh & South Shore	6	182,450	30,438	212,888	11,836	30,438	72,855	121,751	53,078	55,174
Newburgh & South Shore	5 mos.	775,427	54,783	856,689	163,534	163,534	329,446	579,108	118,382	146,937
New Orleans Great Northern	276	246,520	271,903	518,423	45,343	45,343	11,992	199,353	55,214	30,768
New Orleans Great Northern	5 mos.	1,194,532	76,576	1,311,122	191,120	371,682	66,970	919,618	303,064	178,178
New Orleans Terminal	20	5,522	173,763	179,285	15,913	10,853	61,663	90,455	72,302	31,271
New Orleans Terminal	5 mos.	14,651	811,910	856,689	44,913	44,913	306,968	445,945	315,017	252,423
New York Central	6,914	21,502,871	7,699,809	34,492,395	4,671,612	7,354,647	500,284	25,446,008	6,275,915	5,873,365
New York Central	5 mos.	100,416,085	37,789,234	159,928,599	19,676,390	36,786,192	2,345,115	122,418,680	25,894,266	24,811,420
Cincinnati Northern	244	297,442	2,210	310,005	35,053	67,863	6,450	215,591	69,298	62,463
Cincinnati Northern	5 mos.	1,484,891	15,293	1,537,414	178,197	346,763	29,908	1,136,964	291,223	224,920
Cleve., Cinn., Chicago & St. Louis	2,397	6,011,543	1,153,865	8,006,028	888,071	1,682,788	167,667	5,888,950	1,517,829	1,111,772
Cleve., Cinn., Chicago & St. Louis	5 mos.	28,643,172	5,731,554	37,641,183	3,716,827	8,306,703	759,828	28,372,249	6,476,761	5,372,171
Indiana Harbor Belt	117	1,131,488	108,000	1,269,488	121,413	121,413	5,332	686,945	372,603	322,817
Indiana Harbor Belt	5 mos.	5,256,450	540,000	5,796,450	566,957	566,957	25,802	3,488,843	1,448,039	1,222,784
Michigan Central	1,858	5,847,929	1,578,962	8,371,177	1,708,806	1,708,806	138,494	5,636,870	2,090,729	2,137,475
Michigan Central	5 mos.	28,865,313	7,711,977	40,703,317	3,742,025	8,670,412	659,936	27,360,724	10,482,774	8,823,717

# Revenues and Expenses of Railways

MONTH OF MAY AND FIVE MONTHS OF CALENDAR YEAR 1929—CONTINUED

Name of road	Av. mileage operated during period	Operating revenues			Operating expenses			Operating ratio	Net from railway operation	Operating income (or loss)	Net operating income	Net operating income, 1928
		Freight	Passenger (inc. misc.)	Total	Maintenance of way and structures	Traffic	Transportation					
Pittsburgh & Lake Erie.....	231	\$2,710,468	\$178,861	\$3,022,301	\$220,407	\$28,781	\$979,744	77.9	\$2,660,778	\$81,483	\$2,742,261	\$2,742,261
.....5 mos.	231	12,478,515	924,015	14,010,334	1,599,043	1,599,043	5,039,170	77.9	11,755,015	1,416,016	13,171,031	13,171,031
New York, Chicago & St. Louis.....	1,690	4,484,588	166,949	4,651,537	2,706,146	449,967	8,027,773	70.1	1,668,279	5,562,308	4,513,434	4,513,434
.....5 mos.	1,690	21,636,587	684,390	23,075,497	12,027,078	1,034,900	3,633,669	68.9	8,285,444	3,059,307	2,527,197	2,527,197
N. Y., New Haven & Hartford.....	2,132	7,068,823	3,652,547	12,027,078	2,007,782	2,029,860	103,490	68.9	3,341,634	13,947,100	11,358,188	11,358,188
.....5 mos.	2,129	30,744,334	18,510,976	55,524,694	7,251,214	9,934,286	17,831,372	68.5	17,470,640	13,947,100	11,358,188	11,358,188
New York Connecting.....	20	218,361	.....	218,361	17,402	12,314	39,241	28.3	183,333	147,333	118,921	118,921
.....5 mos.	20	1,070,485	.....	1,070,485	278,430	34,722	185,377	41.1	728,882	540,882	408,566	408,566
New York, Ontario & Western.....	568	657,328	86,312	927,261	144,891	193,243	433,344	89.2	100,100	55,057	4,033	4,033
.....5 mos.	568	3,317,126	307,912	4,375,024	552,690	97,487	2,181,551	89.0	3,988,830	211,122	147,874	147,874
Norfolk & Western.....	2,240	9,156,715	402,695	9,874,189	1,221,979	1,670,555	2,168,534	54.9	4,454,512	3,654,285	3,865,101	3,865,101
.....5 mos.	2,240	42,276,261	2,063,643	45,817,485	6,046,536	8,791,670	11,010,915	60.5	18,120,627	14,115,095	15,311,631	15,311,631
Norfolk Southern.....	931	613,545	30,959	696,737	107,555	30,180	276,303	77.5	156,946	105,763	81,457	81,457
.....5 mos.	931	3,093,146	148,403	3,481,387	477,698	134,999	1,352,747	75.1	867,425	611,769	498,222	498,222
Northern Pacific.....	6,792	6,524,979	783,634	8,154,373	1,723,586	1,572,203	2,596,325	79.7	1,656,823	994,106	1,411,064	1,411,064
.....5 mos.	6,792	29,143,983	3,735,713	36,519,093	5,444,044	7,680,099	11,133,885	79.9	7,328,351	4,048,340	6,062,176	6,062,176
Northwestern Pacific.....	477	308,647	167,731	534,895	99,037	79,517	221,586	79.1	111,757	73,438	73,597	73,597
.....5 mos.	477	1,313,471	629,858	2,188,737	482,276	464,645	1,117,641	100.4	196,811	199,385	208,873	208,873
Pennsylvania R. R.....	10,473	43,103,055	10,496,796	59,933,652	7,351,132	11,586,624	19,571,703	70.0	16,811,770	14,589,647	13,380,560	13,380,560
.....5 mos.	10,473	192,831,996	52,821,028	272,723,310	32,948,636	55,101,502	95,427,706	73.0	73,562,558	59,491,567	53,297,911	53,297,911
Long Island.....	404	1,032,977	2,348,828	3,569,669	454,313	536,437	1,289,207	66.1	1,211,229	961,957	786,578	786,578
.....5 mos.	404	4,650,210	10,000,460	15,506,699	1,996,444	2,501,948	6,387,957	72.9	4,206,509	3,521,392	2,779,918	2,779,918
West Jersey & Seashore.....	370	2,052,667	1,413,165	3,645,307	543,712	542,666	1,620,066	77.1	833,313	649,794	534,421	534,421
Peoria & Pekin Union.....	19	15,900	1,227	14,673	20,324	12,569	6,175	76.0	35,175	118,098	37,626	37,626
.....5 mos.	19	103,635	7,930	110,565	84,725	66,053	325,961	73.4	199,741	114,664	195,453	195,453
Pere Marquette.....	2,241	3,561,671	208,429	4,042,633	672,217	820,845	1,294,830	75.3	998,951	730,642	533,623	533,623
.....5 mos.	2,241	16,587,071	1,129,135	18,899,539	1,802,627	3,921,273	6,391,176	69.3	5,810,378	4,566,531	3,906,127	3,906,127
Pittsburgh & Shawmut.....	102	123,628	3,034	128,650	21,539	32,641	36,619	79.6	26,208	24,862	29,965	29,965
.....5 mos.	102	676,037	20,187	706,088	98,012	169,204	206,132	74.0	184,018	177,334	190,917	190,917
Pittsburgh & West Virginia.....	92	406,461	4,217	410,678	31,566	88,680	13,845	56.6	194,105	174,552	233,563	233,563
.....5 mos.	92	1,973,760	21,340	2,156,592	101,731	400,741	86,260	52.7	1,020,379	734,756	1,109,996	1,109,996
Pittsburgh, Shawmut & Northern.....	198	145,672	1,036	150,208	36,289	25,678	44,901	76.4	35,369	32,181	24,235	24,235
.....5 mos.	198	743,538	7,566	751,104	139,090	144,764	282,905	73.4	204,464	189,469	149,814	149,814
Quincy, Omaha & Kansas City.....	249	43,285	8,546	51,831	632	8,141	24,530	120.1	1,815	16,671	19,533	19,533
.....5 mos.	249	194,580	50,304	275,965	125,454	42,119	134,306	110.8	29,829	34,112	65,889	65,889
Reading.....	1,460	7,165,213	580,967	8,444,852	1,496,848	85,831	3,004,655	79.2	1,756,752	1,422,735	1,433,538	1,433,538
.....5 mos.	1,460	34,363,614	2,994,253	40,320,157	5,588,435	9,210,928	15,014,875	78.2	8,807,337	7,022,421	7,045,251	7,045,251
Atlantic City.....	163	110,846	116,511	246,986	61,711	5,169	178,480	112.5	30,787	71,097	95,039	95,039
.....5 mos.	163	543,916	459,112	1,093,154	299,123	137,566	845,226	122.2	24,590	444,114	564,638	564,638
Richmond, Fredericksburg & Potomac.....	117	684,084	244,969	1,120,078	219,308	11,826	354,721	73.1	301,156	245,980	178,404	178,404
.....5 mos.	117	2,815,284	1,850,173	5,624,150	657,455	48,973	1,795,422	65.0	1,967,374	1,634,871	1,310,884	1,310,884
Rutland.....	413	330,045	66,674	414,403	90,361	102,186	11,128	76.6	128,280	97,534	102,176	102,176
.....5 mos.	413	1,460,503	414,403	2,489,109	509,895	53,382	994,075	82.9	424,827	295,353	335,767	335,767
St. Louis-San Francisco.....	5,304	5,327,236	879,706	7,248,201	1,003,355	1,657,586	2,331,201	73.19	1,943,326	1,544,715	1,605,254	1,605,254
.....5 mos.	5,304	25,688,229	4,279,415	33,018,674	4,313,989	6,724,596	11,317,300	72.71	9,010,402	7,002,879	7,439,240	7,439,240
Ft. Worth & Rio Grande.....	233	86,156	105,116	210,124	33,965	3,426	45,416	90.4	205,71	9,901	19,132	19,132
.....5 mos.	233	393,124	38,791	486,058	128,059	16,809	224,154	95.9	589	21,397	65,477	65,477
St. Louis, San Francisco & Texas.....	154	134,552	10,289	153,226	34,174	30,109	57,309	89.2	16,619	13,539	13,207	13,207
.....5 mos.	154	673,671	56,596	762,263	133,099	126,936	287,239	80.5	148,686	133,179	148,686	148,686
St. Louis Southwestern.....	939	1,305,592	7,508,115	8,813,707	1,733,882	209,093	3,697,717	62.4	540,791	481,928	350,723	350,723
.....5 mos.	939	6,868,035	287,673	7,508,115	813,371	1,142,735	1,952,490	61.9	2,856,915	2,543,128	1,906,206	1,906,206
St. Louis Southwestern of Texas.....	807	445,921	35,840	545,999	220,144	29,445	668,359	126.1	142,360	169,908	144,904	144,904
.....5 mos.	807	2,478,342	174,804	2,958,958	1,283,187	144,169	3,736,548	126.3	777,590	917,997	796,950	796,950
San Diego & Arizona.....	156	89,884	103,353	193,237	20,180	17,428	23,789	70.1	25,57	19,666	20,491	20,491
.....5 mos.	156	459,424	103,353	574,511	101,242	83,204	149,665	70.2	171,096	141,655	141,349	141,349
Seaboard Air Line.....	4,490	4,213,460	429,372	5,142,430	590,803	194,411	1,758,508	70.2	1,534,985	1,208,255	1,089,612	1,089,612
.....5 mos.	4,490	20,886,953	3,808,851	27,186,859	3,263,181	4,482,653	884,519	71.2	7,830,848	9,123,507	5,184,212	5,184,212
Southern Ry.....	6,730	9,230,463	1,689,695	11,916,610	2,104,206	2,448,030	3,974,316	72.5	3,305,682	2,486,112	2,590,557	2,590,557
.....5 mos.	6,730	45,357,422	8,977,479	59,171,021	9,116,435	10,443,207	19,883,520	72.5	16,280,078	12,415,779	11,736,797	11,736,797





## Traffic News

(Continued from page 167)

favor of Fargo, N. D. because of a conflict between the new rates and the higher interstate rates. The freight stations in the two cities are only a mile and a half apart. He also said that the new rates would cost the North Dakota carriers \$118,000 yearly.

James Morris, attorney general for North Dakota and H. A. Bronson, assistant attorney general, argued that the new rates should be permitted to become effective so as to allow the Interstate Commerce Commission to determine their practical effect.

### Boston to Washington, 9½ Hours

The Pennsylvania and the New York, New Haven & Hartford, beginning July 14, will operate a new fast train between Washington and Boston, running through in 9½ hours; leave Washington 12:30 p. m.; leave Boston 11:30 a. m. The train will be a counterpart of the Congressional Limited and an extra fare will be charged.

The new train is to be called "The Senator" and its speed matches the fastest trains now running between New York and Boston and between New York and Washington. There will now be three through passenger trains each way daily between Boston and Washington.

"The Senator" is to have an observation car with the end built to resemble the veranda of a summer hotel.

### Proposed Paint Tariff Suspended

The Interstate Commerce Commission has suspended from July 8, to February 8, the operation of schedules as published in Supplements Nos. 29 and 30 to the Consolidated Freight Classification No. 5, Agent D. T. Lawrence's I. C. C.-O. C. No. 49, Agent R. C. Fyfe's I. C. C. No. 18 and Agent E. H. Dulancy's I. C. C. No. 23. The suspended schedules propose to revise the classification of paints, varnish, etc., with resultant increases and reductions. For example, it is proposed to change the classification rating of varnish, in metal cans or pails, in boxes, I. C. C., from second class to third class in official, southern and western classification territories and to change the classification rating of paint, in metal cans or pails, in boxes, I. C. C., from fourth class to third class in southern and western classification territories.

### New York to Los Angeles, 46 Hours

The New York Central on Monday, July 8, announced that, supplementing its 60-hour air-rail transcontinental schedule, a 46-hour schedule would be at once established; and the first trip was begun that night at 11:20.

By this line, the airway section of which is operated by the Western Air Express, passengers leave New York at 11:20 p. m.; arrive in Chicago 7:30 p. m. first day; leave Chicago by either the Chicago & Alton, 8:15 p. m., or by the Atchison, Topeka & Santa Fe, 8:10 p. m.; and ar-

rive Kansas City 8 a. m., second day. From Kansas City the trip is completed wholly by airplane, direct to Los Angeles, arrival there being scheduled at 6:30 p. m., second day.

The fare is \$245, including berths on the cars and meals on the airplanes. The planes will stop at Amarillo, Tex.; Albuquerque, N. M., and Kingman, Ariz.

### Pennsylvania Establishes New Trains

The Pennsylvania, on July 7, established a fast passenger train between Chicago and the East and added two fast trains between St. Louis and New York. The Fort Duquesne, the new train out of Chicago, departs at 9:50 a. m., arriving in New York at 6:50 the next morning. This service speeds up the overland mail between the Pacific and Atlantic coasts over 16 hours.

From St. Louis the Gotham now leaves at 6 p. m. instead of 4:50 p. m., and arrives in New York at 6:50 p. m. the following evening as before, making the time 23 hours, 10 minutes. This gives St. Louis three 24-hour trains for New York, the Gotham, the American and the Spirit of St. Louis. The "Juniata" has taken over the old schedule of the Gotham, leaving St. Louis at 4:50 p. m.

The westbound companion train to the Gotham is another new 24-hour train called the Pilgrim. It leaves Boston at 3 p. m., and New York at 9:20 p. m. and reaches St. Louis the following day at 8:30 p. m.

Through Boston sleeping cars from St. Louis and Cincinnati to Boston have been added to The Spirit of St. Louis.

### Mid-West Shippers' Board

A probable increase of 11 per cent in the level of agricultural and industrial activity in Mid-West territory in the third quarter of 1929, as compared with the corresponding months a year ago, was predicted at the nineteenth regular meeting of the Mid-West Shippers' Advisory Board at Ft. Wayne, Ind., on July 11. This forecast covered the States of Illinois, Iowa and Wisconsin, western Indiana and northern Michigan. There will probably be an increase of 40 per cent in the movement of iron and steel, an increase in the coal movement of approximately 32 per cent and of 25 per cent in the movement of hay, straw and alfalfa. Increases of 20 per cent and 15 per cent respectively are predicted in the movement of grain and flour and 10 per cent in petroleum and potatoes. An increase of 8 per cent is forecast in the movement of machinery and boilers.

Decreases were reported in four lines, amounting to 5 per cent for poultry and dairy products, 7 per cent for canned goods, 10 per cent for sugar, syrup and molasses, and 15 per cent for sand, gravel and stone.

A consolidation of the reports of the various commodity committees indicates that the 26 principal commodity classes will produce a freight traffic of 1,515,231 cars. This is an increase of 148,561 cars or of approximately 11 per cent above the total in the third quarter last year.

## Equipment and Supplies

### Locomotives

THE SIERRA RAILWAY OF CALIFORNIA is inquiring for one 2-8-2 type locomotive.

THE GREAT NORTHERN is inquiring for twelve 4-8-4 type passenger locomotives.

THE RIO GRANDE DO SUL (Brazil) is inquiring through W. R. Grace & Co., New York, for ten 2-10-4 type locomotives.

THE ILLINOIS CENTRAL has ordered five 600-hp. oil-electric locomotives from Ingersoll-Rand Company and the General Electric Company.

THE PARACATU RAILWAY is inquiring for three locomotives, one of the 4-6-0 type, one of the 4-6-2 type and one of the 2-8-2 type. Joaquim Ribeiro de Oliveira, chief engineer, Bom Despacho, E. de Minas Geraes, Brazil.

THE TIMKEN ROLLER BEARING COMPANY has ordered one experimental locomotive from the American Locomotive Company. This locomotive is to be of the 4-8-4 type; it will have 27-in. by 30-in. cylinders, 73-in. driving wheels and a total weight in working order of 410,000 lb.

### Freight Cars

THE HERCULES CEMENT COMPANY has ordered 10 cement cars from the Standard Steel Car Company.

THE WARREN TANK CAR COMPANY has ordered five tank cars from the Standard Steel Car Company.

THE RIO GRANDE DO SUL, Porto Alegre, Rio Grande do Sul, Brazil, is inquiring for 80 steel underframe, single sheathed box cars of 26½ tons' capacity and 50 steel ballast cars of 26½ tons' capacity.

THE INSPIRATION CONSOLIDATED COPPER COMPANY, Aurora, Ill., has ordered four dual side-pivot, drop-door air-dump cars from the Western Wheeled Scraper Company. Inquiry for this equipment was reported in the *Railway Age* of May 11.

### Passenger Cars

THE RIO GRANDE DO SUL, Porto Alegre, Rio Grande do Sul, Brazil, is inquiring for 21 passenger cars.

THE BOARD OF TRANSPORTATION, City of New York, is asking for prices until 11:30 a. m. August 20 on 300 steel passenger cars for subway service.

THE NEW YORK CENTRAL has ordered 75 express refrigerator cars from the Merchants Dispatch Transportation Company.



THE GREAT NORTHERN has ordered two dining cars from the Pullman Car & Manufacturing Corporation, in addition to one car reported in the *Railway Age* of June 1.

THE MINNEAPOLIS & ST. LOUIS has ordered three gas-electric rail motor cars from the St. Louis Car Company. The Electro-Motive Company will furnish the power plants which will be of the 300 h. p. size. Inquiry for this equipment was reported in the *Railway Age* of June 22.

## Iron and Steel

THE GREAT NORTHERN is inquiring for 30,000 tons of rail.

THE CHICAGO, BURLINGTON & QUINCY is inquiring for 400 tons of structural steel for a subway at Omaha, Neb.

## Signaling

THE UNION PACIFIC has ordered from the General Railway Signal Company material for an electric interlocking, 134 working levers, at Tower B, Omaha, Neb.

### Pennsylvania Cab Signals

The Pennsylvania has ordered from the Union Switch & Signal Company material for equipping 139 locomotives with cab signals, the Union continuous system. These engines are run between Philadelphia and Washington and the roadway equipment is now being installed.

### Extensive New Signaling on B. & M.

The Boston & Maine has contracted with the Union Switch & Signal Company for the installation of electro-pneumatic interlockings at Lynn, Mass., a 43-lever machine; at Wakefield Junction, 7 levers; at Winchester, 39 levers and at Waltham, 19 levers; and for the installation of a Union dispatcher control system on the line, eight miles long, double-track, between Wilmington, Mass., and Winchester. This dispatcher order includes 76 switch movements, 115 searchlight signals and other material.

A contract has been let also to the General Railway Signal Company for the installation of a G R S dispatching system on the Fitchburg division, covering 72 miles of line, double-track. There will be five control machines. At East Portal (Hoosac Tunnel), there will be a machine in the interlocking tower controlling the line between that point and Montague, Mass., 35 miles, and one at Gardner for the line between Tyter and East Fitchburg, 37 miles. At Fitchburg one mechanical interlocking will be eliminated. The order includes 150 switch machines, 642 color-light signals and other material. Provision will be made for running trains in either direction on either main track for long distances, thus making an increase in facilities nearly equal to that which would be provided by a third track.

## Supply Trade

The **Marion Steam Shovel Company**, Marion, Ohio has appointed the Gesner Contractors' Equipment Company its sales representative at New Haven, Conn., and Philadelphia, Pa.

The **Newhall Chain Forge and Iron Company**, New York has purchased the chain shop and other buildings of the Rensselaer Chain Works, Rensselaer, N. Y.

**Thomas D. Crowley**, has been appointed western sales representative of the **Electric Railweld Sales Corporation** with headquarters in Chicago.

The **C. H. Hollup Corporation**, Chicago, has changed its name to the **Hollup Corporation** and the name of the Transportation Engineering Corporation has been changed to **Hollup Corporation of New York**.

**J. E. Buckingham**, formerly district manager of the railroad division of the **Worthington Pump and Machinery Corporation** with headquarters at St. Louis, Mo., has been appointed acting manager of that division with headquarters at Harrison, N. J. Mr. Buckingham will succeed **D. R. Coleman** who has been granted a six months leave of absence.

The **American Hoist & Derrick Company**, St. Paul, Minn., has opened a branch office and warehouse at 337 South Anderson street, Los Angeles, Cal. **W. H. Lummus**, who has represented the company on the west coast for many years is in charge of the Los Angeles office. **W. M. Cusac**, formerly with the McMyler Interstate Company, Cleveland, Ohio has joined the Chicago sales force of the American Hoist & Derrick Company.

**C. E. Postlethwaite**, who has been appointed assistant vice-president of the **Pressed Steel Car Company**, with headquarters at New York, served on the Pennsylvania Railroad from 1883 to 1890 successively as a rodman in an engineering corps, telegraph operator and car clerk on the Pennsylvania Railroad division. From 1890 to 1897 he was with the Norfolk & Western as chief clerk to the general superintendent. He entered the service of the Schoen Pressed Steel Car Company in 1897. Schoen Company was later merged with the Pressed Steel Car Company. Mr. Postlethwaite was appointed general sales manager of the Pressed Steel Car Company in December, 1915, serving until July 1, 1929, when he was appointed assistant vice-president.

The **Copperweld Steel Company**, Glassport, Pa., has established a north-eastern district under the management of **George F. Bain** with headquarters at 30 Church street, New York City. This district includes all of the New England States and all of New York state north of Westchester and Rockland counties.

**Paul Van Wagner** is now district manager for Greater New York City and for New Jersey, Pennsylvania and West Virginia, with office at 30 Church street, New York City.

**R. C. Brown**, general manager of the **Timken Roller Bearing Service and Sales Company** at Canton, Ohio, has been appointed assistant secretary and assistant treasurer of the **Timken Roller Bearing Company** and is succeeded by **W. H. Richardson**, manager of the New York branch of the Service and Sales Company. **E. H. Austin**, manager of the Kansas City, Mo. branch succeeds Mr. Richardson and in turn is succeeded by **J. L. Halderman**, manager of the Atlanta, Ga. branch. **Parker T. Ancarrow**, manager of the Richmond, Va., branch has been transferred to Atlanta and is succeeded by **Stewart B. Ancarrow**.

**F. O. Schramm**, who has been appointed general sales manager, eastern district, of the **Pressed Steel Car Company**, with headquarters at New York, was born at Chicago, Ill., on October 25, 1891. He entered the service of the Western Steel Car & Foundry Company, a subsidiary of the Pressed Steel Car Company, at Chicago, on June 1, 1907, as stenographer in the operating department. Mr. Schramm continued



F. O. Schramm

in the service in various capacities in the operating and sales departments at the Hegewisch plant and in the Chicago office until January 1, 1917, when he was transferred to the New York office of the Pressed Steel Car Company. He was appointed assistant secretary on March 1, 1921, and assistant general sales manager, eastern district, in February, 1928. Mr. Schramm in becoming general sales manager, eastern district, retains also the duties of assistant secretary.

## Trade Publication

**FEEDWATER HEATER INSTRUCTION BOOK.**—The fifth edition of the feedwater heater instruction book prepared by the Superheater Company, 17 East Forty-Second street, New York, gives full instructions on the operation and maintenance of Elesco feedwater heaters. It is a complete revision of the fourth edition issued in 1926.

## Construction

### \$183,049,600 in Construction Work Authorized During Week

During the week just completed, railway construction projects were authorized amounting to a total estimated expenditure of more than \$183,049,600. The outstanding feature of the week was the final agreement between the New York Central and the City of New York on the proposed Manhattan West Side improvement plan which involves a total expenditure of approximately \$175,000,000. Work on this project will be under way by Fall. Another item which involves a total cost of more than \$4,350,000 is the authorization by the Missouri Pacific of the construction of a second main line track between Eureka, Mo., and Lake Hill, a distance of ten miles, which is a part of its plan to double track its main line between Kansas City, Mo., and St. Louis. The Pittsburgh & West Virginia received the approval of the War Department for the construction of its \$1,000,000 bridge over the Monongahela river at Belle Vernon, Pa., which is a part of its new extension project between Cochran Mills, Pa., and Connellsville.

Approximately \$5,000,000 in contracts were let during the week, including one let to the Bates & Rogers Construction Company, Chicago, for the construction of a second main line track for the Southern, between Rogers Gap, Ky., and Lexington, a distance of 19.6 miles. The Cleveland, Cincinnati, Chicago & St. Louis has awarded contracts for work including the construction of about 22 miles of second main line track and for the reduction of grades on a 40-mile stretch of track. All of this work will be done in the State of Indiana.

**BALTIMORE & OHIO.**—This road has awarded a contract to the Vang Construction Company, Cumberland, Md., for grading work on its lines at Loveland, Ohio estimated to cost about \$100,000.

**BANGOR & ARDOSTOOK.**—This company has authorized a number of construction projects on its lines estimated to involve a total expenditure of approximately \$254,000, as follows: Replacing six existing bridges with similar structures of a heavier type between West Seebois and Houlton, Me., \$66,000; re-location of three-fourths of a mile of track, including a new bridge over the West branch of the Penobscot river, five miles south of Millinocket, Me., \$110,000; construction of two 100-ft. turntables, one at Millinocket and one at Houlton, \$60,000; extensions to three side tracks and the building of one new side track and wye track, \$18,415. A contract for steelwork on the bridges and for the erection of the two turntables has been awarded to the Bethlehem Steel Company. The remainder will be done with company forces.

**BESSEMER & LAKE ERIE.**—Construction work involving an estimated expenditure

of \$75,750 has been authorized by this company including the replacing of a 252 ft. single track through truss span bridge on its north bound track at Greenville, Pa., by one 176 ft. single track through truss span and a 76 ft. through girder span, and also the replacing of about 90 ft. of timber trestle with three deck girder spans. All of the masonry for the new bridgework is now in place with the exception of one pier.

**BIJOU HILLS & EASTERN.**—Plans have been prepared by this company for the construction of a railway between Bijou Hills, S. D., and Mitchell, necessitating the construction of 85 miles of line in Brule, Aurora and Davison counties.

**BOSTON & ALBANY.**—This company plans to demolish the older of its two engine houses at West Springfield, Mass., and to replace it by the construction of an 18-stall engine house, of which four stalls, each 142 ft. long, will be in the drop pit section and the remaining 14 stalls will each be 120 ft. in length. The cost of the work has been estimated at approximately \$560,000.

**BROWARD COUNTY PORT AUTHORITY.**—The Broward County, Fla., Port Authority, which is developing a deep water harbor at Lake Mabel, near Fort Lauderdale, Fla., has applied to the Interstate Commerce Commission for a certificate authorizing the construction of a line of 3.5 miles connecting with the tracts of the Seaboard All-Florida and the Florida East Coast.

**CHICAGO, BURLINGTON & QUINCY.**—A contract has been let to the James Stewart Corporation, Chicago, for the construction of a reinforced concrete grain elevator at St. Louis, Mo., which will have a capacity of 1,250,000 bu. This elevator which will be 200 ft. high, will have outside dimensions of 83 ft. by 100 ft. and will involve an expenditure of about \$500,000.

**CLEVELAND, CINCINNATI, CHICAGO & ST. LOUIS.**—Contracts have been let for the construction of second main track and the reduction of grades on 40 miles of line in Indiana, involving about 1,800,000 cu. yd. of grading. A contract has been awarded to the Nelson and Chase & Gilbert Company, Chicago, for about 100,000 cu. yd. of grading and the placing of 1,850 cu. yd. of masonry for the construction of second main track between Mounds, Ind., and Williams Yard, 10 miles, two stations between Anderson and Muncie. When this project is completed the entire Cleveland and Indianapolis divisions, between Cleveland, Ohio, and Indianapolis, Ind., will be provided with double track. Two contracts have been let to the Walsh Construction Company, Davenport, Iowa, one of which involves the double-tracking of 22 miles of line on the Chicago division between Whitestown, Ind., and Colfax and includes approximately 600,000 cu. yd. of grading and the placing of 5,000 cu. yd. of concrete. The other contract awarded to the same company includes 1,100,000 cu.

yd. of grading and the placing of 13,000 cu. yd. of concrete for the construction of double track and the reduction of grades between Terre Haute, Ind., and Sanford, 8 miles. A contract for the construction of two grade separation structures at Linndale, Ohio, has been let to the Hecker-Moon Company, Cleveland. The entire contract requires the placing of 5,400 cu. yd. of concrete and one of the grade separation projects involves the extension and widening of the present structure at Park avenue, Linndale. A second contract for grade separation work, at Clinton road, Cleveland, and which requires the placing of 6,000 cu. yd. of concrete and the excavation of 25,000 cu. yd. of earth has been awarded to the Stevens Construction Company, Cleveland.

**ELIZABETH SOUTHERN.**—This company has applied to the Interstate Commerce Commission for a certificate authorizing the construction and operation of a line from Elizabeth to Kinder, La., 30.5 miles, to serve a timber territory. R. M. Hallowell, Elizabeth, La., is president of the company.

**ERIE.**—This company has awarded a contract to Arthur McMullen Company, New York, for the elimination of a grade crossing on its lines in Wellsville, N. Y. Contracts also have been let to I. M. Ludington & Son and to Whitmore, Rauber & Vicimus, of Rochester, N. Y., for the construction of two crushed stone and concrete driveways in that city.

**GULF COAST LINES.**—A contract for the construction of an oil house at De Quincy, Ala., with dimensions of 24 ft. by 80 ft. has been awarded to the Orange Car & Steel Co., Orange, Tex.

**LEHIGH VALLEY.**—An order has been issued by the New York Public Service Commission for the elimination of a highway grade crossing by means of an underpass on this company's lines about one mile north of the Kendia station in the town of Varick, N. Y. The new bridge carrying the tracks is to be a single span of solid floor structure, supported on concrete abutments, with a width of 32 ft. between abutments. The project has been estimated to cost about \$118,400.

**MAYO & COOK'S HAMMOCK.**—The Interstate Commerce Commission has authorized this company to construct a line from Mayo, Fla., to Cook's Hammock, 13 miles; estimated cost, \$200,000.

**MISSOURI PACIFIC.**—This company has authorized the construction of a second main track between Eureka, Mo., and Lake Hill, 10.4 miles, as a part of its program of double tracking on the main line between Kansas City, Mo., and St. Louis. As a part of the project a cut-off will be constructed between Eureka and Jedburg which will shorten the line between those two points 1.9 miles. At the same time both the new and the old main tracks will be raised above the highest known high water mark and two grade crossings at Valley Park, Mo., and one at Lake Hill will be eliminated by the construction of highway subway structures.



The total cost of this work is estimated at more than \$4,350,000.

**NEW YORK, CHICAGO & ST. LOUIS.**—A contract has been let to the Roberts and Schaefer Company, Chicago, for the construction of a direct engine coaler at Lorain, Ohio.

**NORTHERN PACIFIC.**—This company plans to apply to the Interstate Commerce Commission for permission to construct a branch line in eastern Montana from a point near Woodrow, north 24 miles in the direction of Bloomfield. The projected extension, which will be a branch line extending from the recently completed Glendive-Brockway branch, will involve an expenditure of about \$750,000.

**PITTSBURGH & WEST VIRGINIA.**—This company has received the approval of the War Department on its plans for its new \$1,000,000 bridge over the Monongahela river at Belle Vernon, Pa., which will carry the tracks of its new extension from Cochran Mills to Connellsville, Pa. A contract for the substructure of the bridge has been let to the Vang Construction Company, Pittsburgh, and for the super-structure to the American Bridge Company. The bridge is to be a double-deck structure, 2,750 ft. in length and 170 ft. above the water line at its center. The river span will be 450 ft. long and 6,580 tons of steel will be required in its construction. The upper deck of the bridge, 140 ft. above water, will carry the tracks of the Pittsburgh & West Virginia, while the lower-deck, 60 ft. above the water line, will be used for the tracks of the Pittsburgh Steel Company, which will connect the plants of this company on either side of the river at that point. Both decks will be single track.

**READING.**—Work will be started soon on the elimination of two grade crossings on this company's lines at the Barley Mill road and old Baltimore pike near Wilmington, Del. The two crossings are to be eliminated by the construction of an underpass, which has been estimated to cost \$113,750, including approaches. In addition to this there will be an additional expenditure of about \$53,067 for the construction of new roads to the underpass, making a total of about \$166,817 for the project. The cost of the bridge and its approaches will be borne by the Reading Company and the Levy Court of Newcastle County. The cost of the new roads in connection with the underpass is to be borne by the Delaware Land Improvement Company.

**SANTA FE, SAN JUAN & NORTHERN.**—The Interstate Commerce Commission has authorized this company to operate in interstate commerce a line between San Ysidro and a point near Tilden, N. M., which heretofore has been operated only in intrastate commerce, and to construct an extension from a point near Tilden to Cuba, N. M., 11 miles. The company also was authorized to operate under

trackage rights over the line of the Santa Fe Northwestern between San Ysidro and Bernalillo, N. M., 24 miles.

**SOUTHERN (Cincinnati, New Orleans & Texas Pacific).**—A contract has been let to the Bates & Rogers Construction Company, Chicago, for the construction of second main track between Rogers Gap, Ky., and Lexington, 19.6 miles.

**SOUTHERN PACIFIC.**—This company contemplates the expenditure of about \$750,000 for improvements at Eugene, Ore., and Springfield. These will include the construction of second main track from Eugene to Springfield Junction at a cost of about \$350,000, and the construction of an addition to the passenger yard at Eugene, enlargement of the freight station and the construction of new stock pens and additional trackage in the yards.

### Contract Signed for \$175,000,000 New York Improvement Plan

In the presence of officers of the New York Central and representatives of the city, Mayor James J. Walker, of New York, on July 5, signed a final contract between the railroad company and the city for the carrying out of the \$175,000,000 West Side improvement plan in Manhattan. The plan calls for the elimination of all grade crossings on the island from St. John Park (Beach street) to Spuyten Duyvil, the removal of tracks from Eleventh street and the beautification of Riverside Park. The reaching of an agreement closes forty years of negotiation between the New York Central and the city over this project.

R. D. Starbuck, vice-president, and E. F. Stephenson, secretary, of the New York Central, signed for the railroad. Corporation Counsel Arthur J. W. Hilly attested the agreement. Others present who witnessed the signing of the pact included Richard E. Dougherty, engineering assistant to P. E. Crowley, president of the railroad; Arthur A. Tuttle, chief engineer of the Board of Estimate; William G. Fullen, chairman of the Transit Commission; Charles F. Kerrigan, assistant to the Mayor; Mrs. John Clapper-Kerr, president of the Women's League for the Preservation of Riverside Park, and Mrs. William H. Yates, corresponding secretary of the league.

Officers of the railroad announced that work on the project will be started this fall and that the entire project will be completed within six years. It is estimated it will take about four years, before the elevated structure is completed between Canal street and Thirtieth street and the tracks are removed from the surface of the streets.

From Thirtieth street to Sixtieth street the tracks are to be depressed and from the latter point on through Riverside Park they will be roofed over for the construction of the city's new elevated express highway. Work will be started first on the stretch of tracks south of Thirtieth street. The New York Central will contribute \$110,000,000, the city \$50,000,000 and the state of New York \$15,000,000 toward the cost of the improvement.

## Financial

**BIJOU HILLS & EASTERN.**—Articles of incorporation have been filed in South Dakota by this company for the construction of a railway between Bijou Hills, S. D., and Mitchell, 85 miles. The capitalization has been fixed at \$1,000,000. The incorporators are: M. D. Woodbury and James W. Sobeck, Bijou Hills; J. E. Salman, O'Neil, Neb.; G. E. A. Seaman, Mitchell; G. J. Danforth, Sioux Falls, S. D. It is expected that financial assistance will be given the project by farmers along the projected right of way. For construction purposes the same incorporators have formed the Atlas Engineering Company, with a capitalization of \$500,000.

**BOSTON & MAINE.**—Not Seeking to Control Other Lines.—This company, following reports published in the daily press to the effect that it was acquiring stock of other New England lines, made public the following categorical denial: "The Boston & Maine Railroad has taken no step looking to absorption of the Bangor & Aroostock or the Maine Central Railroads, and the Boston & Maine is accumulating no stock of any other line."

**BUFFALO, ROCHESTER & PITTSBURGH.**—Bonds.—The Interstate Commerce Commission has authorized this company to procure the authentication and delivery of \$756,000 of its consolidated mortgage bonds, to be held in the treasury as reimbursement, in part, for expenditures made for capital purposes.

**CANADIAN NORTHEASTERN.**—Purchase.—The Consolidated Mining & Smelting Company of Canada has purchased this road. By a charter granted at the last session of the Provincial legislature, the railway has been given five years in which to extend the line from its present northern terminus to the Finlay river and an additional three years in which to build a branch from some point on the line to the British Columbia-Yukon boundary.

**CENTRAL VERMONT.**—New Company.—Announcement of plans for the formation of a new Vermont corporation to take over the property of the Central Vermont Railway Company after the sale of the property at public auction in St. Albans on July 29 has been made by Receiver John W. Redmond. Present plans, Judge Redmond said, call for the creation of an operating company to be known by the name of "Central Vermont Railway, Inc." It is not expected, the statement further said, that there will be any bidders at the auction except the principal creditor, the Canadian National. The required legislation has been passed to enable the Canadian National to own the stocks and bonds of the new company, and if the Central Vermont property is purchased on July 29 in behalf of the Canadian National that "company will oc-

(Continued on page 179)

# Annual Report

## Great Northern Railway Company

**Excerpts from Fortieth Report of the Great Northern Railway Company,  
Year Ended December 31, 1928**

### Capital Stock

There has been no change during the year in the authorized capital stock, which remained at \$250,000,000, and of which there had been issued to December 31, 1928 .....

.....\$249,740,550  
Of this latter amount there was held in the Treasury \$735,900, the amount actually outstanding in the hands of the public being \$249,004,650, an increase of \$37,400 during the year. This increase represents \$59,900 fully paid and issued stock subscribed for at par by residents of the territory served by the extension west of Scobey, Montana, and the return to the treasury of \$22,500 formerly held by the Great Northern Employees' Investment Company, Limited.

### Funded Debt

There was a decrease of \$1,546,300 in the funded debt made up as follows:

The St. P. M. & M. Ry. Co. Consolidated Mortgage Bonds redeemed through the operation of the Sinking Fund .....	\$ 1,000
Notes maturing and paid during 1928, under the various equipment trust agreements .....	1,545,300
Decrease .....	<u>\$1,546,300</u>

### Unified Operation of Great Northern Railway Company and Northern Pacific Railway Company

Applications for approval of the plan for the unification of Great Northern Railway Company, Northern Pacific Railway Company and Spokane, Portland and Seattle Railway Company, to which reference was made in the last Annual Report, are still pending before the Interstate Commerce Commission. All briefs have been filed and the argument was concluded on October 6, 1928. The case is now in the hands of the Commission for its decision.

### Extension of Line into California

An application has been filed with the Interstate Commerce Commission for authority to build an extension from Klamath Falls, Oregon, to a point near Lookout, California, a distance of approximately 88 miles. Simultaneously with the filing of this application by the Great Northern an application was filed by the Western Pacific for authority to build a line from Paxton to a point near Lookout, approximately 115 miles. The construction of these two pieces of track, which will make physical connection between the Great Northern and the Western Pacific, will establish a new railway between the northwestern and southwestern parts of the United States and provide an advantageous route for handling the growing traffic between those regions, and will also give both the Great Northern and the Western Pacific access to the pine lumber producing territory and agricultural valleys between Klamath Falls and Westwood. This territory, which is roughly 200 miles long by 100 miles wide, is now without railway facilities connecting it directly with San Francisco and southern California or with the Northwest. It is said to be the largest productive area in the United States without railway transportation.

### Freight Traffic

A synopsis of the tons of freight moved and revenues received for the years 1928 and 1927 is given in the table at the top of the next page.

The increase in revenue from agricultural products is due principally to larger grain and apple crops. During 1928 the Company handled 163,000,000 bushels of grain, or an increase over 1927 of 24,000,000 bushels. The movement of apples in 1928 amounted to 21,753 cars as compared with 16,277 cars handled in 1927. There was an increase in the movement of iron ore over 1927 of 541,587 long tons; the Great Northern

iron ore traffic in 1928 totaled 13,530,795 long tons. There were substantial increases in the movement of crude petroleum, petroleum products, agricultural implements, automobiles and auto trucks.

### Passenger Traffic

There was a decrease of 9.53 per cent in the total passenger revenue compared with 1927. During the past five years this source of revenue has gradually declined. As stated in previous reports, the cause is the increasing use of automobiles.

The Great Northern on June 10, 1929, inaugurated 63-hour service between Chicago and the Pacific Coast west-bound, and 61 hour 15-minute service east-bound, which is the same time as the fast trains operating between Chicago and California coast points have made for several years. Distance, grade, and curvature are all very favorable on the Great Northern, and the new schedule can be made with absolute comfort and with the same on time dependability as the Oriental Limited which will continue as a 68-hour train. It will not be necessary to provide additional train mileage as two through trains have been operating for many years; but the fast train will be distinctively equipped with de luxe Pullman cars as a companion train to the Oriental Limited, which will take the place of the slower Glacier Park Limited that has been operating the standard Pullman equipment regularly in use on most trains. The new train will be called The Empire Builder in honor of James J. Hill, and will save a business day at coast points or at eastern terminals. It will also traverse the most scenic region in the northwestern United States in daylight. Completion of the Cascade Tunnel made possible these and other improvements in passenger service.

### Freight and Passenger Revenues

Revenues per mile, years 1919 to 1928, have been as follows:

Calendar Year	Freight Revenue per net ton mile (cents)	Passenger Revenue per passenger per mile (cents)
1919 .....	.970	2.784
1920 .....	1.054	3.000
1921 .....	1.301	3.442
1922 .....	1.134	3.358
1923 .....	1.070	3.326
1924 .....	1.064	3.240
1925 .....	1.058	3.161
1926 .....	1.048	3.185
1927 .....	1.054	3.175
1928 .....	1.027	3.124

These figures indicate a gradual lowering of the average freight rates and passenger fares since 1921.

The lower freight revenues per net ton mile represent generally an adjustment, usually downward, in the rates on various classes and commodities. The ton mile revenue was slightly higher in 1927 due to a smaller movement of iron ore that year, the rate on iron ore being less per net ton mile than the average.

The reduction in revenue per passenger mile has been due partly to the practice of cutting rates on account of automobile and bus competition. Except for excursion fares that have become quite prevalent, passenger rates would not have decreased as much as they have, and it is possibly true that gross and net passenger revenues have been lessened by this practice. Such seems to have been the result of reducing passenger fares on the English railways. American railways quite generally have undertaken to recover their failing passenger business by cutting rates, and this general policy necessarily has affected the Great Northern.

### Immigration and Agricultural Development

The development work is being continued in co-operation with the various agricultural colleges. The campaign for increasing dairy and live stock products is showing good results. During the past four years, 110,000 sheep, 2,500 pure-bred sires

[ADVERTISEMENT]



Commodity	1928		1927		Increase—I; Decrease—D	
	Tons	Gross Revenue	Tons	Gross Revenue	Tons	Gross Revenue
Products of agriculture.....	6,794,458	\$34,320,193	6,101,472	\$28,610,074	I 692,986	I \$5,710,119
Animals and products.....	553,824	4,335,803	557,299	4,316,897	D 3,475	I 18,906
Products of mines.....	19,812,988	19,128,731	19,375,241	18,855,937	I 437,747	I 272,794
Products of forests.....	3,968,926	14,463,202	3,684,362	14,366,922	I 284,624	I 96,280
Manufactures and miscellaneous.....	4,462,977	31,732,402	4,124,694	28,255,200	I 338,283	I 3,477,202
Total .....	35,593,173	\$103,980,331	33,843,008	\$94,405,030	I 1,750,165	I \$9,575,301

and 8,000 dairy cattle have been placed on farms in Minnesota, North Dakota and Montana. In the past three years over one thousand people have settled on the different irrigation projects in Montana. Experienced irrigation farmers are increasing the sugar beet acreage in Montana, which, together with the beet acreage in Minnesota and North Dakota, will insure a large increase in the 1929 crop and a corresponding increase in the output of the beet sugar factories located on the company's line. In co-operation with the Montana State Agricultural College, modern farming methods are being gradually applied. The use of improved tractors and combine-harvesters has made it possible to increase the wheat acreage; in many instances, farmers have enlarged their operations by acquiring adjoining land. Government reports show an increasing prosperity in Montana and that 121,400 acres of state lands were sold in 1928, indicating a substantial increase in the number of settlers.

#### Wage Increases

The increase in wages, settled by direct agreement or awarded by arbitration boards, in 1927-1928, amounted to approximately \$1,500,000 per year, or over 3%. Wages are now at the highest point in railway history, being above the war time peak in average per hour and average per employee per year.

#### Maintenance of Track, Structures and Equipment

The physical property continues to improve. Application of washed ballast, treated ties, heavier rail and new track fastenings have brought the main lines to a uniform high standard of maintenance. The equipment is also in first class condition, which is evidenced by the fact that in October, 1928, the percentage of bad order freight cars on the line was a little over 3 per cent of the total and the percentage of locomotives out of service for heavy repairs was even less than in 1927. Comparative statement of operating expenses reflects an increase of \$3,507,483 in maintenance of way. This increase is largely due to retirements of property, principally the abandonment of the old line between Peshastin and Winton, Washington, the new line having been placed in operation on October 7, 1928. Maintenance of equipment expenses reflect a decrease of \$1,102,760. This decrease is due to the heavy charges in the previous year by reason of extraordinary repairs and retirements in that year. During the year 1928, the revenue freight moved exceeded ten billion ton miles, the largest tonnage in the history of the railway.

#### Changes of Line and Electrification in the Cascade Mountains

The extensive improvements in the Cascade Mountains have been successfully completed. The longest tunnel (7.79 miles) in the Western Hemisphere was placed in service on January 12, 1929. This, together with the line changes on the east and west slopes of the Cascades, constitutes an entirely new and very advantageous crossing of that range.

The great project was dedicated to the illustrious Empire Builder and founder of the Great Northern Railway, James J. Hill, because the completed tunnel symbolizes the main idea behind his career, namely, the importance of economy and efficiency in railway operation. The program at the opening of the tunnel was broadcast to the nation. President Hoover, in his address over the radio, made the following statement:

"The opening of a great transportation tunnel is more than an engineering accomplishment. It is a contribution for all time to quickened and cheapened transportation. Through these savings it adds something to the productivity and prosperity of far-flung communities which it serves. In the end it means a mite of contribution to better living of many hundreds of thousands of people."

#### Growth of the Railway

The growth of the railway during the past sixty years, as measured by miles of road operated, is given below:

	Year	Miles of Road Operated
The Saint Paul and Pacific Railroad .....	1868	121
The Saint Paul and Pacific Railroad .....	1878	560
The Saint Paul, Minneapolis and Manitoba Railway .....	1888	2,697
Great Northern Railway .....	1898	4,698
Great Northern Railway .....	1908	6,716
Great Northern Railway .....	1918	8,259
Great Northern Railway .....	1928	8,582

The miles operated in 1928 include the Spokane, Coeur D'Alene & Palouse Railway Company, a wholly owned subsidiary of the Great Northern, which operates 173 miles in Idaho and Eastern Washington.

The destiny of the Great Northern Railway is inseparably tied up with the great northwestern part of the United States. The property has so many physical advantages both in the way of favorable location for access to traffic, and in the way of short distances between important cities, easy grades, and a preponderance of straight line, which make for economical operation, that, with a rational policy of regulation, it cannot help but prosper as the territory continues to develop and increase in wealth and population.

There is an excessive number of through railway routes in the Northwest, considering the present available traffic. The consolidation of the Great Northern, Northern Pacific, and Spokane, Portland and Seattle Railways, which has been proposed and is now before the Interstate Commerce Commission for decision, would in large measure relieve that condition, and in our judgment make for better railway service, lower rates, and a more secure financial status on the part of all of the Northwest carriers. The competitors of the Great Northern and Northern Pacific probably would benefit as much as would those companies.

[ADVERTISEMENT]

## Financial News

(Continued from page 177)

occupy substantially the same relation to the new company that it has for years occupied in respect to the old Central Vermont, that is, the new company will be a 'subsidiary' of the Canadian National." It will take some months after the sale on July 29, Judge Redmond continued, to close the receivership which has been in effect since December 12, 1927, and turn the property over to the new company. He said further:

The receivers have substantially completed their principal task of rehabilitating the property of the Central Vermont. The railroad is today a better railroad than it was before the flood; has better equipment of every kind, in-

cluding the very best passenger and freight locomotives that can be made. It is now rendering freight and passenger service to the satisfaction of all of its patrons. During the work of rehabilitation the Canadian National has aided the receivers in every conceivable way, but especially by expert advice and co-operation to the end that the receivers might be able in the most economic and efficient way to restore the devastated property.

The flood of November, 1927, left the Central Vermont a twisted and prostrate wreck. Two hundred and fifty-three miles of its track were very seriously damaged; 54 bridges were carried away or destroyed; the material required to restore the damaged roadbed was 1,296,000 cubic yards.

At the time of the flood the Central Vermont owed about \$14,000,000 expressed in bonds of that amount outstanding secured by a mortgage on all of its property. It owed the Canadian National about \$20,000,000 of unsecured indebtedness, and owed other unsecured indebtedness to a large amount. The Canadian National also owned about two-thirds of the outstanding capital stock of the Central Vermont Railway Co. The total estimated damage to the property of

the company as a result of the flood was more than \$2,668,000.

#### CHESAPEAKE & OHIO.—Final Valuation.

—The Interstate Commerce Commission has found the final value for rate-making purposes of the property owned and used by the C. & O. for common-carrier purposes as of June 30, 1916, to be \$187,935,000, and that of the property used but not owned to be \$7,764,335. The final value of the property of the Chesapeake & Ohio of Indiana, owned and used, was placed at \$9,314,000. According to the report the C. & O. books record an investment of \$213,130,013, including land, as of valuation date, but it is stated that if certain readjustments were made to

(Continued on page 181)

# Michigan Central Railroad Company—Annual Report

## To the Stockholders of

### THE MICHIGAN CENTRAL RAILROAD COMPANY:

The Board of Directors herewith submits its report for the year ended December 31, 1928, with statements showing the income account for the year and the financial condition of the company.

## The Year's Business

During 1928 the company moved 32,100,897 tons of revenue freight, an increase as compared with 1927 of 685,046 tons, largely the result of greater activity in the automobile industry.

Revenue passengers carried were 3,520,539, a decrease of 251,584, of which 36,597 were in interline, 180,020 in local, and 34,967 in commutation passengers. The falling off in the number of passengers is, in the main, incident to the competition of the motor bus and private automobile.

## Income Account for the Year

	Year ended Dec. 31, 1928	Year ended Dec. 31, 1927	+ Increase — Decrease
<b>OPERATING INCOME</b>			
Railway operations	1,858.42 miles operated	1,858.42 miles operated	
Railway operating revenues	\$93,217,493.20	\$89,750,601.95	+\$3,466,891.25
Railway operating expenses	62,643,935.11	62,244,288.16	+ 399,646.95
<b>NET REVENUE FROM RAILWAY OPERATIONS</b>	\$30,573,558.09	\$27,506,313.79	+\$3,067,244.30
<b>Percentage of expenses to revenues</b>	(67.20)	(69.35)	— (2.15)
Railway tax accruals	\$6,327,936.69	\$6,247,714.64	+ \$80,222.05
Uncollectible railway revenues	25,064.20	25,668.93	— 604.73
<b>RAILWAY OPERATING INCOME</b>	\$24,220,557.20	\$21,232,930.22	+\$2,987,626.98
Equipment rents, net debit	\$513,355.81	\$294,778.82	+ \$218,576.99
Joint facility rents, net debit	551,234.13	538,883.24	+ 12,350.89
<b>NET RAILWAY OPERATING INCOME</b>	\$23,155,967.26	\$20,988,825.80	+\$2,167,141.46
<b>MISCELLANEOUS OPERATIONS</b>			
Revenues	\$403,831.95	\$395,388.09	+ \$8,443.86
Expenses and taxes	342,445.30	321,030.59	+ 21,414.71
<b>MISCELLANEOUS OPERATING INCOME</b>	\$61,386.65	\$74,357.50	— \$12,970.85
<b>TOTAL OPERATING INCOME</b>	\$23,217,353.91	\$21,063,183.30	+\$2,154,170.61
<b>NON-OPERATING INCOME</b>			
Income from lease of road	\$278.04	\$236.51	+ \$41.53
Miscellaneous rent income	327,663.24	230,775.18	+ 96,888.06
Miscellaneous non-operating physical property	73,525.62	70,151.22	+ 3,374.40
Dividend income	811,029.99	582,958.00	+ 228,071.99
Income from funded securities	323,999.33	749,775.96	— 425,776.63
Income from unfunded securities and accounts	480,742.61	319,349.11	+ 161,393.50
Miscellaneous income	15,125.89	7,826.78	+ 7,299.11
<b>TOTAL NON-OPERATING INCOME</b>	\$2,032,364.72	\$1,961,072.76	+ \$71,291.96
<b>GROSS INCOME</b>	\$25,249,718.63	\$23,024,256.06	+\$2,225,462.57
<b>DEDUCTIONS FROM GROSS INCOME</b>			
Rent for leased roads	\$2,736,593.38	\$2,735,315.46	+ \$1,277.92
Miscellaneous rents	4,158.76	4,898.33	— 739.57
Miscellaneous tax accruals	64,361.92	70,474.24	— 6,112.32
Interest on funded debt	2,890,543.66	3,158,934.65	— 268,390.99
Interest on unfunded debt	14,194.71	22,977.43	— 8,782.72
Amortization of discount on funded debt	141,549.60	154,408.44	— 12,858.84
Maintenance of investment organization	1,883.19	1,306.45	+ 576.74
Miscellaneous income charges	7,013.54	9,383.08	— 2,369.54
<b>TOTAL DEDUCTIONS FROM GROSS INCOME</b>	\$5,860,298.76	\$6,157,698.08	— \$297,399.32
<b>NET INCOME</b>	\$19,389,419.87	\$16,866,557.98	+\$2,522,861.89
<b>DISPOSITION OF NET INCOME</b>			
Dividends declared: 40 per cent each year	\$7,494,560.00	\$7,494,560.00	
<b>SURPLUS FOR THE YEAR CARRIED TO PROFIT AND LOSS</b>	\$11,894,859.87	\$9,371,997.98	+\$2,522,861.89

\* Credit.

## Profit and Loss Account

<b>BALANCE TO CREDIT OF PROFIT AND LOSS, DECEMBER 31, 1927</b>	\$82,166,229.90
<b>ADDITIONS:</b>	
Surplus for the year 1928	\$11,894,859.87
Profit on property sold	22,026.29
Unrefundable overcharges	24,226.61
	11,941,112.77
<b>DEDUCTIONS:</b>	
Depreciation prior to July 1, 1907, on	\$94,107,342.67

equipment retired during year	\$148,936.04
Loss on property retired	153,261.03
Miscellaneous items and adjustments (net)	73,448.61
	375,645.68

**BALANCE TO CREDIT OF PROFIT AND LOSS, DECEMBER 31, 1928** \$93,731,696.99

## Operating Revenues

The total operating revenues were \$93,217,493.20, an increase of \$3,466,891.25.

Freight revenue was \$64,098,143.67, an increase of \$3,743,053.65.

Passenger revenue was \$19,792,566.77, a decrease of \$410,119.54.

Mail revenue was \$1,115,531.12 or \$66,946.26 more than for 1927, the result of an increase in rates of approximately 15 per cent effective August 1, 1928, under order of the Interstate Commerce Commission.

Express revenue was \$4,039,628.41, a decrease of \$76,351.79, a smaller volume of business having been handled.

Other transportation, incidental and joint facility revenue was \$4,171,623.23, an increase of \$143,362.67.

## Operating Expenses

The following table shows the operating expenses by groups:

Group	Amount	Increase	Decrease
Maintenance of way and structures	\$9,993,461.94		\$351,456.98
Maintenance of equipment	18,429,411.96	\$1,710,523.95	
Traffic	1,599,588.67	88,512.24	
Transportation	29,414,897.69		110,867.58
Miscellaneous	1,275,415.59	107,566.60	
General	2,001,532.67		1,024,797.44
Transportation for investment—credit	70,373.41		19,833.84
<b>Total</b>	\$62,643,935.11	\$399,646.95	

The decrease in expense for maintenance of way and structures is largely due to a reduction of approximately 110,000 in the number of ties used for renewals, as a result of the application in prior years of treated ties of longer life, and a decrease of 130,000 yards in ballast applied.

The increase in expense for maintenance of equipment is largely the result of an increase in the number of locomotives receiving heavy repairs and in the number of freight cars requiring general reconditioning. There were also increased charges for retirements of both of these classes of equipment.

The decrease in transportation expenses is, in the main, incident to economies effected and to improved operating practices.

The increase in expense for miscellaneous operations is chiefly due to the extension of dining car service.

The principal decrease in general expenses is found in charges for pensions. Commencing with 1925 the company has each year charged to expenses and set up in a reserve an amount to provide for estimated total payments upon pensions granted in that year. Pursuant to recently issued instructions of the Interstate Commerce Commission, however, this practice has been discontinued and the pension expenses for the year 1928 include only the actual payments for pensions applicable to that year and prior to 1925, no charges for a reserve having been made. This has produced a decrease of \$951,541 in pension charges as compared with 1927.

## Net Income Before Dividends

The net income of the company was \$19,389,419.87, an increase of \$2,522,861.89.

## Dividends

Dividends declared and charged against the income of the year were as follows:

Date declared	Date payable	Rate per cent	Amount
June 13, 1928	July 28, 1928	20	\$3,747,280.00
December 12, 1928	January 29, 1929	20	3,747,280.00
	<b>Total for the year</b>	<b>40</b>	<b>\$7,494,560.00</b>

## Surplus

After charges for dividends aggregating 40 per cent, there remained a surplus, for the year, of \$11,894,859.87 which was carried to the credit of profit and loss. At the end of the year the total corporate surplus was \$100,428,397.45.

## Capital Stock

The capital stock of the company remained unchanged during the year, the total amount authorized and issued being \$18,738,000.

[ADVERTISEMENT]



### Changes in Funded Debt

The funded debt outstanding on December 31, 1927, was ..... \$67,525,318.00

It has been reduced as follows:

By payments falling due during the year on the company's liability for principal installments under Equipment Trust Agreements as follows:

M C R R Trust of 1915, October 1, 1928....	\$300,000.00	
M C R R Trust of 1917, March 1, 1928....	600,000.00	
M C R R Co proportion of N Y C R R Co Trust of 1920, April 15, 1928.....	467,664.75	
N Y C Lines Trust of 1922, June 1, 1928....	373,000.00	
N Y C Lines 4½ per cent Trust of 1922, September 1, 1928 .....	51,000.00	
N Y C Lines Trust of 1923, June 1, 1928....	632,000.00	
N Y C Lines Trust of 1924, June 1, 1928....	233,000.00	
N Y C Lines 4½ per cent Trust of 1924, September 15, 1928 .....	173,000.00	
N Y C Lines 4½ per cent Trust of May 15, 1925, May 15, 1928 .....	234,000.00	3,063,664.75
leaving the funded debt on December 31, 1928 ...	\$64,461,653.25	

### Property Investment Accounts

Changes in the property investment accounts for the year, as shown in detail elsewhere in this report, were as follows:

Road increased .....	\$2,275,619.85
Equipment decreased .....	1,517,844.34
Improvements on leased railway property increased.....	176,999.56
Miscellaneous physical property decreased.....	403,257.28
a net increase of .....	\$531,517.79

### Improvements

Important improvements completed or under way during the year were as follows:

Grade separation:

At Joseph Campau Avenue, Hamtramck, Michigan; at State Highway M-13, Grand Rapids, Michigan; and at Southfield Road, Dearborn, Michigan, work was completed. Permanent grade separation bridges were constructed at Waterman Avenue, Detroit, to replace trestles. Work progressed at West Fort Street, Detroit, and at West Central Avenue, Toledo, Ohio. The Broadway overhead highway bridge just west of the station at Ann Arbor was reconstructed and

street and driveway approaches to the station improved. Bridge over Deep River on Joliet Branch:

Work was started late in the year on a permanent concrete and steel bridge to replace the long timber trestle over Deep River on the Joliet Branch west of East Gary.

Work in Canada:

The Otter Creek viaduct, a five span steel girder double track bridge on high steel bents near Cornell, Ontario, was strengthened by placing additional girders and incasing steel of towers with concrete. Passing tracks for the purpose of handling longer trains were constructed at Tilbury, West Lorne, Tillsonburg, La Sallette, Waterford, Perry and Welland.

### Automatic Train Control

During the year, in addition to the installations of automatic train control between Detroit, Michigan, and Chicago, Illinois, which have been previously reported to the stockholders, the track between Detroit and Toledo, Ohio, has been so equipped and the control placed in operation.

### Proposed Lease of the Company's Properties to The New York Central Railroad Company

The proceedings before the Interstate Commerce Commission in which The New York Central Railroad Company is seeking the authority of the Commission for the leasing of the lines of railroad and properties of this company, referred to in the annual reports for 1926 and 1927, are still pending. Additional evidence was introduced at hearings held January 9-16, 1928.

### Valuation of the Company's Property by the Interstate Commerce Commission

No decision has yet been made by the Interstate Commerce Commission as to the company's protest in respect to the tentative valuation of its properties.

The Board wishes to express its appreciation of the loyal and efficient service of the officers and employees of the company during the year.

For the Board of Directors,  
P. E. CROWLEY,  
President.

[ADVERTISEMENT]

## Financial News

(Continued from page 179)

conform to the accounting classification this would be reduced to \$196,487,105. The cost of reproduction new and cost of reproduction less depreciation of the property owned and used, exclusive of lands and including the carrier's portions of jointly owned minor facilities, were found to be \$200,687,969 and \$159,651,464, respectively.

CHESAPEAKE & OHIO.—*Opposes Consolidation of Unification Proceedings.*—This company has filed with the Interstate Commerce Commission an answer to the petition of the Wabash which had asked the commission to combine into one proceeding the various pending applications for authority to acquire control of roads in eastern territory. The C. & O. says that its application involves a special proposal which seems to require that it be heard and determined as of itself.

CHICAGO & ALTON.—*Foreclosure.*—Federal Judge George A. Carpenter on July 6, ordered the sale of this road to satisfy two defaulting mortgages totaling \$38,000,000. The actual date of the sale was not set because of an expected appeal to the United States Circuit court which cannot hear the case until fall. The decree for foreclosure and the sale of the road was presented by Bruce Johnstone who represented the Farmers' Loan and

Trust Company, trustee for one of the mortgages. Henry A. Lundahl, who acted as master in chancery, was appointed special master by the court to take charge of the sale, which is scheduled to be held at Wilmington, Will County, Ill.

CHICAGO, ROCK ISLAND & PACIFIC.—*Bonds of St. Paul & Kansas City Short Line.*—The Interstate Commerce Commission has authorized the St. Paul & Kansas City Short Line, a subsidiary of the Rock Island, to issue \$600,000 of first mortgage bonds to be delivered to the parent company at par in reimbursement of indebtedness. Authority has been granted the Rock Island to assume obligation and liability as guarantor of these bonds. They will bear interest at 4½ per cent and will mature February 1, 1941.

COLUMBUS & GREENVILLE.—*Equipment Trust.*—The Interstate Commerce Commission has authorized this company to issue at par \$450,000 of equipment trust notes, series A, bearing interest at 5½ per cent and maturing serially from April 1, 1930 to October 1, 1939. The notes will be delivered to the American Car & Foundry Company in the ratio of \$1500 in equipment trust notes and \$400 in cash in payment for a total of 300 steel underframe box cars.

DELAWARE & NORTHERN.—*Reorganization.*—The Public Service Commission of New York has approved a plan of Samuel R. Rosoff for reorganization of

the Delaware & Northern Railway Company, to be known as the Delaware & Northern Railway Company. The new company is authorized to issue 50,000 shares of common capital stock without par value, which is not to be sold to the public. The commission's memorandum, approved by the commission, was written by Chairman Prendergast who, with Commissioner Van Namee conducted hearings on the petition. The railroad which Mr. Rosoff proposes to rehabilitate and operate has been in the hands of receivers since December 21, 1921. The receivers sold the property December 15, 1928, free and clear of incumbrances pursuant to a decree of the United States District Court of Northern District. Mr. Rosoff paid \$70,000 for the property, a 37.5-mile line.

DULUTH, MISSABE & NORTHERN.—*Proposed Lease of D. & I. R.*—This company has applied to the Interstate Commerce Commission for authority to lease and operate the property of the Duluth & Iron Range for a period of 15 years at an annual rental of \$1,200,000 plus an amount representing depreciation and 6 per cent on the cost of additions and betterments. Both companies are controlled by the United States Steel Corporation, which owns all the stock, except directors' shares, of the D. M. & N., and of the Minnesota Iron Company which owns the stock of the D. & I. R.

FONDA, JOHNSTOWN & GLOVERSVILLE.—*Annual Report.*—The annual report of this company for 1928 shows net deficit

after interest and other charges of \$70,240, as compared with net deficit in 1927 of \$1,361. Selected items from the income statement follow:

FONDA, JOHNSTOWN & GLOVERSVILLE			
	1928	1927	Increase or Decrease
Average Mileage operated .....	86.69	88.77	— 2.08
RAILWAY OPERATING REVENUES ..	1,036,156	1,150,928	—114,772
Maintenance of way .....	139,848	159,151	— 19,303
Maintenance of Equipment .....	124,881	127,815	— 2,934
Transportation .....	342,781	351,809	— 9,028
TOTAL OPERATING EXPENSES .....	749,352	782,804	— 33,452
Operating ratio .....	72.32	68.02	4.30
NET REVENUE FROM OPERATIONS .....	286,804	368,124	— 81,320
Railway tax accruals .....	75,964	77,012	— 1,048
Railway operating income .....	210,840	291,112	— 80,272
NET RAILWAY OPERATING INCOME .....	221,121	300,258	— 79,137
Non-operating income .....	91,425	87,006	4,419
GROSS INCOME .....	312,546	387,264	— 4,419
TOTAL DEDUCTIONS FROM GROSS INCOME .....	58,654	61,403	— 2,749
Interest charges .....	324,132	324,500	— 368
*NET INCOME .....	70,240	1,361	68,879
Disposition of net income .....			
Total dividends for year (preferred stock) ..	30,000	30,000	.....
*Balance carried to profit and loss .....	100,240	28,639	71,601

\*Deficit 1928 and 1927—Dividends paid from surplus.

**LOUISVILLE & NASHVILLE.—Abandonment.**—The Interstate Commerce Commission has authorized this company to abandon its Kennedy Creek branch from Arlo to Doeray, Ala., 2 miles.

**MAYO & COOK'S HAMMOCK.—Securities.**—This company has applied to the Interstate Commerce Commission for authority to issue 500 shares of common stock without par value and \$150,000 of first mortgage bonds for the purpose of constructing its proposed line from Mayo to Cook's Hammock, Fla.

**MONONGAHELA.—Securities.**—This company has applied to the Interstate Commerce Commission for authority to issue \$4,000,000 of common stock and \$10,000,000 of first consolidated mortgage 4½ per cent bonds.

**NEW YORK, ONTARIO & WESTERN.—Equipment Trust Certificates.**—This company has applied to the Interstate Commerce Commission for authority for an issue of \$660,000 of 5 per cent equipment trust certificates.

**NASHVILLE, CHATTANOOGA & ST. LOUIS.—Stock Dividend.**—The stockholders of this company at a meeting in Nashville, Tenn., on July 9 authorized the board of directors to apply to the Interstate Commerce Commission for permission to issue a stock dividend of 60 per cent. The directors subsequently authorized President Hill to take steps necessary to obtain an amendment to the charter of the company providing for an increase of \$9,600,000 in the capital stock. The

proposed increase will make the stock of the system \$25,600,000. The semi-annual dividend of 3½ per cent was declared.

**OKLAHOMA UNION.—Receivership.**—United States District Judge Franklin E. Kannemar at Tulsa, Okla., placed this road in the hands of receivers on July 1, following a petition filed by the Mississippi Valley Trust Company of St. Louis, Mo. Joseph A. Frates, Sr., president of the road, and Felix A. Bodovitz, assistant city attorney for Tulsa, were appointed receivers for the railroad and its motor coach subsidiary, the Union Transportation Company. The total indebtedness of this road which operates between Tulsa and Sapulpa, is \$1,406,225.

**TOLEDO, PEORIA & WESTERN.—Annual Report.**—The annual report of this company for 1928 shows net income after interest and other charges of \$242,582, as compared with net income of \$32,498 in 1927. Selected items from the income statement follow:

TOLEDO, PEORIA & WESTERN			
	1928	1927	Increase or Decrease
Average Mileage operated .....	239.42	239.50	— .08
RAILWAY OPERATING REVENUES ..	2,179,189	1,766,020	413,169
Maintenance of way .....	403,855	391,174	12,681
Maintenance of Equipment .....	246,546	228,031	18,515
Transportation .....	756,125	722,241	33,884
TOTAL OPERATING EXPENSES .....	1,643,700	1,530,263	113,437
Operating ratio .....	75.43	87.68	— 12.25
NET REVENUE FROM OPERATIONS .....	535,489	235,757	299,732
Equipment rents—Net Dr. ....	177,088	131,965	45,123
Joint facility rents—Net Cr. ....	13,734	6,946	6,788
NET RAILWAY OPERATING INCOME .....	308,748	90,734	218,014
Other income .....	9,965	10,650	— 685
GROSS INCOME .....	318,713	101,383	217,330
Interest on funded debt .....	60,000	60,000	.....
TOTAL DEDUCTIONS FROM GROSS INCOME .....	76,131	68,886	7,245
NET INCOME .....	242,582	32,498	210,084

### Final Valuations

The Interstate Commerce Commission has issued final valuation reports finding the final value for rate-making purposes of the property owned and used for common-carrier purposes as of the respective valuation dates as follows:

Miami Mineral Belt .....	\$ 327,925	1919
Detroit & Toledo Shore Line .....	2,960,000	1917
Chesapeake & Ohio .....	187,935,000	1916
Chesapeake & Ohio of Indiana .....	9,314,000	1916

### Dividends Declared

Nashville, Chattanooga & St. Louis.—\$3.50, semi-annually, payable August 1 to holders of record July 20. This dividend is payable on the old stock before giving effect to the 60 per cent stock dividend declared April 9.

Philadelphia & Trenton.—2½ per cent, quarterly, payable July 10 to holders of record June 30 to July 11.

Pittsburgh, Cincinnati, Chicago & St. Louis.—2½ per cent, payable July 20 to holders of record July 10.

### Average Prices of Stocks and of Bonds

	July 9	Last week	Last year
Average price of 20 representative railway stocks ..	147.78	146.84	119.04
Average price of 20 representative railway bonds ..	90.44	89.83	94.28

## Officers

### Executive

**George H. Burgess** has been elected president of the Tennessee, Alabama & Georgia, with headquarters at Chattanooga, Tenn., succeeding **L. C. Smallwood**, resigned.

**E. E. Crabtree**, assistant to the president of the Chicago, Springfield & St. Louis, with headquarters at Jacksonville, Ill., has been appointed vice-president, with the same headquarters.

**A. L. Horst**, assistant to the president of the Cambria & Indiana, with headquarters at Philadelphia, Pa., has been elected executive vice-president, with the same headquarters. The position of assistant to the president has been discontinued.

**William G. Black**, mechanical assistant of the president of the Erie, with headquarters at Cleveland, Ohio, has been appointed mechanical assistant to the president of the Chesapeake & Ohio with headquarters at the same point. **Richard Brooke**, engineer of maintenance of way, with headquarters at Richmond, Va., has been promoted to engineering assistant to the president, with headquarters at Cleveland. A sketch of Mr. Brooke's railway career and a reproduction of his photograph appeared in *Railway Age* of May 4, page 1085.

**Frank R. Pechin**, who has been elected vice-president in charge of operation of the Chicago, St. Paul, Minneapolis & Omaha, with headquarters at St. Paul, Minn., has been connected with that railway and the Chicago & North Western for 48 years. He was born in Chester county, Pa., on July 29, 1857, and received his academic education in the public schools and at



Frank R. Pechin

Downington Academy. He entered railway service on July 20, 1880, as a brakeman on the North Western and later



he was advanced to conductor. During 1890 Mr. Pechin served as a conductor on the Louisville Southern (now part of the Southern) and in the following year he returned to the North Western in the same capacity. From 1897 to 1902 he advanced successively through the positions of inspector of passenger service, trainmaster at Chicago and assistant superintendent at the same point. He was then promoted to superintendent of the Wisconsin and Milwaukee divisions and in 1908 he was further promoted to general superintendent of the Omaha, with headquarters at St. Paul. Mr. Pechin was promoted to general manager, with headquarters at St. Paul, in 1925, his election to vice-president becoming effective on July 1.

**George D. Ogden**, traffic manager of Eastern region of the Pennsylvania, with headquarters at Pittsburgh, Pa., has been appointed assistant vice-president-traffic, with headquarters at New York. He will have general supervision over the promotion of the company's business in New York City and its adjacent territory. Mr. Ogden was born at Homer City, Indiana County, Pa., on May 16, 1868. He was educated at the Indiana Normal School and Washington and Jefferson College, entering railway service in June, 1887, as freight and ticket agent for the Pennsylvania at Homer, Pa. From 1890 to 1901 he served successively as night yard clerk at Allegheny City, Pa., transportation clerk in the superintendent's office, West Penn division; freight and ticket agent at Butler, Pa.; freight agent and yard master at McKeesport, Pa.; and freight agent at Harrisburg, Pa. On the latter date Mr. Ogden was appointed division freight agent at Altoona, Pa., and from 1903 to 1906 he served in similar capacity on the Buffalo & Allegheny Valley division at



George D. Ogden

Pittsburgh. He was promoted to assistant general freight agent at Philadelphia on March 1, 1906, serving in that position until May, 1912, when he was further advanced to general freight agent. Mr. Ogden was appointed freight traffic manager, lines east of Pittsburgh, in May, 1916, and in March

1920, he became traffic manager, the position he held at the time of his recent promotion to assistant vice-president. His entire railroad service has been with the Pennsylvania. In October, 1917, Mr. Ogden organized Traffic Emergency Committee to devise methods for avoiding congestion of war materials. In December of the same year, at the request of the General Operating Committee, Eastern Railroads, Railroads' War Board, he organized the Export Division of that committee and when the name was changed to the Freight Traffic Committee, North Atlantic Ports, during federal control, he continued as chairman until June, 1918. On the latter date, upon the creation of the Exports Control Committee, Mr. Ogden was chosen chairman of that committee.

### Financial, Legal and Accounting

**A. Trevvett**, secretary and treasurer of the Chesapeake & Ohio and the Hocking Valley, with headquarters at Cleveland, Ohio, has also been appointed secretary and treasurer of the Pere Marquette.

**J. A. Cummiskey** has been appointed assistant secretary of the Mobile & Ohio, with headquarters at St. Louis, Mo. **Rufus Creekmore** has been appointed tax commissioner, with headquarters at St. Louis, succeeding **R. C. Beckett, Jr.**, resigned.

**C. S. Sikes**, vice-president and general auditor of the Pere Marquette, has been appointed comptroller, with headquarters as before at Detroit, Mich. **J. O. Talbott**, assistant general auditor, has been appointed assistant comptroller, with headquarters at Detroit. **A. C. Rhodes**, assistant auditor, has been appointed auditor, with headquarters at Detroit.

**E. C. Morris**, general auditor of the Pullman Company, has been promoted to comptroller, succeeding **L. S. Taylor**, vice-president and comptroller, who retains the position of vice-president. **L. M. Bradish**, assistant general auditor, has been promoted to assistant comptroller. **H. R. Holmgren**, assistant general auditor, has been promoted to general auditor to succeed Mr. Morris. The headquarters of all of these officers are at Chicago.

**F. C. Nicodemus, Jr.**, assistant general counsel of the St. Louis Southwestern has been promoted to general counsel, with headquarters as before at New York, succeeding **Winslow S. Pierce**. **E. B. Perkins**, general attorney at Dallas, Tex., has been appointed general attorney, emeritus. **Adair Dyer** has been appointed assistant general attorney, with headquarters at St. Louis, Mo. **B. F. Botts**, commerce counsel, has been appointed assistant general attorney, with headquarters as before at St. Louis.

**W. H. Kirkbride**, engineer of maintenance of way and structures of the Pacific lines of the Southern Pacific, with headquarters at San Francisco, Cal., has also been placed in charge of valuation work on those lines incident to the transfer of the valuation department to the vice-president in charge of operations. **G. E. B. Welles**, valuation officer, has been appointed consulting valuation officer, with headquarters as before at San Francisco, reporting to the valuation counsel. **J. B. Baker** has been appointed valuation officer in immediate charge of the valuation department, succeeding Mr. Welles. Mr. Baker will report to the engineer of maintenance of way and structures.

### Operating

**W. H. Lohrey** has been appointed superintendent of dining car service of the Kansas City Southern, with headquarters at Kansas City, Mo.

**F. F. McNamee** has been appointed terminal trainmaster of the Cleveland, Cincinnati, Chicago & St. Louis, with headquarters at Toledo, Ohio.

**R. H. Fish**, general superintendent of the Southern Ontario district of the Canadian National, with headquarters at Toronto, Ont., has been granted a leave of absence. **T. C. Hudson** has been appointed acting general superintendent during Mr. Fish's absence.

**H. J. Hadden**, assistant to the general manager of the Chicago, Springfield & St. Louis, with headquarters at Springfield, Ill., has been appointed general manager, with the same headquarters.

**Lee H. Landis**, has been appointed general manager of the Chesapeake Beach Railway, succeeding **W. J. Hayward**, resigned. The position of assistant to the president formerly held by Mr. Landis has been abolished.

**G. W. Bennett**, assistant superintendent of the Buffalo, Rochester & Pittsburgh, with headquarters at Rochester, N. Y., has been appointed transportation assistant, with same headquarters.

**J. A. Anderson**, superintendent of the Chicago-Petoskey division of the Pere Marquette, with headquarters at Grand Rapids, Mich., has been transferred to the Port Huron-Grand Rapids division, with headquarters at Saginaw, Mich., to succeed **J. A. Grigware**, who has been transferred to the Chicago-Petoskey division.

**F. J. Gavin**, assistant general manager of the lines of the Great Northern east of Williston, N. D., has been promoted to general manager of those lines, with headquarters as before at Duluth, Minn. Mr. Gavin succeeds **F. Bell**, who has headquarters at St. Paul, Minn., and who retired from active duty on June 15.

**J. B. Briscoe**, superintendent of the Plains division of the Atchison, Topeka

& Santa Fe, with headquarters at Amarillo, Tex., has been appointed acting assistant general manager of the Western lines, with headquarters at the same point, succeeding **F. L. Myers**, who has been granted a temporary leave of absence because of ill health. **J. R. Skillen**, trainmaster on the New Mexico division at Las Vegas, N. M., has been appointed acting superintendent of the Arkansas River division, with headquarters at La Junta, Colo., succeeding **C. S. Cravens**, who has been appointed acting superintendent of the Plains division to replace Mr. Briscoe. Mr. Cravens who was promoted to superintendent of the Arkansas River division on June 15, has been connected with that railway for more than 30 years. He was born at Mansfield, Tex., on May 14, 1886, and entered railway service at the age of 12 years as a caller-messenger on the Santa Fe at Roswell, N. M. Three years later he was promoted to warehouseman and clerk and from 1904 to 1920 Mr. Cravens served successively on the Santa Fe as an operator, cashier, agent at Higgins, Tex., and Canadian special livestock agent at Amarillo and transportation inspector. He was then promoted to trainmaster at Clovis, N. M., on November 1, 1920, where he remained until April 14, 1923, when he was transferred to Wellington, Kan. On March 15, 1926, Mr. Cravens was promoted to assistant superintendent at Amarillo, his promotion to superintendent becoming effective just prior to his temporary transfer from the Arkansas River division to the Plains division.

**James R. Branley**, who has been promoted to superintendent of the Missouri River division of the Minneapolis, St. Paul & Sault Ste. Marie, with headquarters at Bismarck, N. D., has been in railway service for about 14 years. He was born at Melrose, Minn., on November 25, 1897, and after graduating from high school in 1916 he entered railway service on June 1 of that year as a clerk in the office of a superintendent of the Great Northern. Previous to his graduation from high school he had worked as a section laborer on the Great Northern during the summer months of 1913, 1914 and 1915. During the World War Mr. Branley served in the Aviation Corps of the United States Army, then returning to the Great Northern as an assistant roadmaster. In 1920 he was appointed roadmaster on the Soo line at Crosby, Minn., where he remained until 1924 when he became a special representative of the president. From May, 1926, to his recent promotion he served as trainmaster at Superior, Wis., and at Gladstone, Mich., with the exception of a short period in 1928 when he attended a special transportation school at Harvard University. Mr. Branley's promotion to superintendent of the Missouri River division became effective on June 25.

**C. W. L. Mickley**, superintendent of telegraph of the Gulf Coast Lines and the International-Great Northern, with headquarters at Houston, Tex., retired

from active duty on July 1 at the age of 70 years, having spent 42 years in railway service. He was born at Hamburg, Pa., on June 15, 1859, and at the age of 13 years obtained his first telegraph experience with the Western Union. Later Mr. Mickley was employed by the Philadelphia & Reading (now the Reading) at Philadelphia, Pa., and then re-entered the service of the Western Union at New York as an operator handling telegraph dispatches on the New York Herald. In 1885 he was transferred to Texas, handling Associated Press dispatches at Dallas, Tex., and at Galveston. Two years later he returned to railway service on the Texas & Pacific at Marshall, Tex., and several months afterward he became an operator on the International & Great Northern at Palestine, Tex. Mr. Mickley advanced successively through the positions of wire chief and office manager at that point and in 1911 he was promoted to superintendent of telegraph, with headquarters at Houston. He was appointed superintendent of telegraph of the Gulf Coast Lines in 1925.

**Kepler Johnson**, who has been promoted to superintendent of the Oklahoma-Southern division of the Chicago, Rock Island & Pacific and the Chicago, Rock Island & Gulf and master mechanic of the latter road, with headquarters at Fort Worth, Tex., has been connected with the operating department of those railways for 16 years. He was born at Chicago on December 26, 1877, and after graduating from the Chicago Manual Training School in June, 1896, entered railway service as a machinist apprentice at the Burnside (Ill.) shops of the Illinois Central.



Kepler Johnson

Later in the same year he became a locomotive fireman on the Western division of the Michigan Central and for the following 17 years he served in that capacity and in various clerical positions in the local freight office and in the general freight office of the Atchison, Topeka & Santa Fe at Chicago, as contracting freight agent on the Santa Fe at Chicago, as assistant chief clerk to the assistant general manager at St. Louis, Mo., and chief clerk to the superintendent at

Little Rock, Ark., on the Missouri Pacific; as transportation inspector and assistant superintendent on the Denver & Rio Grande at Denver, Colo., and Alamosa and as transportation inspector on the Santa Fe at Chanute, Kan. Mr. Johnson then entered the service of the Rock Island as a trainmaster on the Indian Territory division at Shawnee, Okla. Later he was transferred successively to the Southern division at Fort Worth, Tex., to the Arkansas division at Little Rock and to the Kansas division at Topeka. During the World War he served as general agent for the American Railway Association at Camp Pike, Ark. His promotion to superintendent of the Oklahoma-Southern division became effective on June 15.

**F. A. Bogue**, who has been promoted to superintendent of the Nebraska-COLORADO division of the Chicago, Rock Island & Pacific, with headquarters at Fairbury, Neb., has been connected with that railroad for 24 years. He entered the service of the Rock Island in 1905 as a general clerk at Topeka, Kan., and subsequently served as chief clerk and transportation clerk at that point. In



F. A. Bogue

1909 he was transferred to Chicago in the latter capacity and later acted as contract and maintenance clerk at Chicago. Mr. Bogue was appointed assistant chief clerk at Des Moines, Iowa, in 1912 and in 1915 he became contract representative in the office of the second vice-president at Chicago. Three years later he was advanced to chief clerk to the general manager at Chicago, then being promoted to passenger trainmaster at the same point in 1919. In 1922 he was transferred to the Cedar Rapids-Minnesota division with the title of trainmaster and in 1928 he was transferred to Blue Island, Ill. Mr. Bogue's promotion to superintendent became effective on June 15.

## Traffic

**W. E. Bernthal**, special representative of the comptroller of the St. Louis-San Francisco, has been appointed assistant



general freight agent, with headquarters at St. Louis, Mo.

**Frank R. Forbes**, district freight and passenger agent of the Spokane, Portland & Seattle at San Francisco, Cal., has been promoted to general agent at Spokane, Wash., succeeding **J. T. Hardy**, who at his own request has been appointed traveling freight and passenger agent at Portland, Ore.

**D. H. Hoops**, general freight agent of the Chicago & North Western, has been promoted to assistant freight traffic manager, with headquarters as before at Chicago. **R. C. Kerr**, assistant general freight agent at Chicago, has been promoted to manager of the industrial department, with headquarters at the same point, succeeding **Carl R. Gray, Jr.**, who was recently appointed general manager of the Chicago, St. Paul, Minneapolis & Omaha. **R. O. Small**, general agent for the North Western at Philadelphia, Pa., has been promoted to general freight agent, traffic, with headquarters at Chicago. **S. G. Nethercot**, assistant general freight agent, has been promoted to general freight agent, rates and traffic, with headquarters as before at Chicago. Mr. Small and Mr. Nethercot fill the positions left vacant by the promotion of Mr. Hoops. **M. B. Hutchins**, general agent at Cincinnati, Ohio, has been promoted to assistant to the vice-president, traffic, with headquarters at Chicago. **J. E. Flansburg** has been appointed assistant to the vice-president, rates and divisions, with headquarters at Chicago. **C. N. Hale**, traveling agent at Philadelphia, has been promoted to general agent at that point, to succeed Mr. Small and **G. L. Helmstadter**, traveling agent at New York, has been promoted to general agent at Cincinnati, replacing Mr. Hutchins.

**Andrew H. Shaw**, who has been promoted to passenger traffic manager of the Pennsylvania, with headquarters at New York, has been connected with that railway for nearly 35 years. He



Andrew H. Shaw

was born on November 30, 1880, at Pittsburgh, Pa., and after graduating from high school entered railroad service as a clerk on the Pennsylvania

Lines West of Pittsburgh on September 18, 1894. He occupied various clerical positions for the following 16 years and on May 1, 1910, he was advanced to chief clerk to the passenger traffic manager. Six years later he was promoted to assistant to the general passenger agent and in 1919 he was further promoted to assistant general passenger agent. On March 1, 1920, Mr. Shaw was promoted to general passenger agent, with headquarters at Chicago, a position he held until his promotion to passenger traffic manager on July 1.

**Ray M. Flocker**, who has been promoted to passenger traffic manager of the Pennsylvania, with headquarters at Pittsburgh, Pa., was born in Millvale, Pa., in January 1891. He entered railroad service in November, 1908, as clerk in the passenger department of the Pennsylvania at Pittsburgh, Pa. He served in various capacities until June, 1926, when he was appointed assistant general passenger agent of the same



Ray M. Flocker

road with headquarters at Pittsburgh. In November, 1928, Mr. Flocker was transferred in the same capacity to Philadelphia, where he remained until his recent promotion to the position of passenger traffic manager.

## Mechanical

**George McCormick**, general superintendent of motive power of the Southern Pacific, with headquarters at San Francisco, Cal., has also been appointed general superintendent of motive power of the Northwestern Pacific.

**Kepler Johnson**, superintendent of the Oklahoma-Southern division of the Chicago, Rock Island & Pacific, with headquarters at Fort Worth, Tex., has also been appointed superintendent and master mechanic of the Oklahoma-Southern division of the Chicago, Rock Island & Gulf.

**W. M. Johnson**, assistant foreman at the Nashville (Tenn.) shops of the Nashville, Chattanooga & St. Louis, has been promoted to master mechanic of the Chattanooga division and the Chattanooga terminal, with headquarters at

Chattanooga, Tenn., succeeding **A. J. Law**, deceased.

## Purchases and Stores

**George C. Smith**, who retired from active service on July 1 as purchasing agent of the Union Pacific, with headquarters at Omaha, Neb., was born in Canada in 1859. He graduated from the



George C. Smith

Upper Canada College at Toronto, Ont., and after attending the University of Toronto for two years lived in France and England for the following two years. In 1881 Mr. Smith returned to Canada and became connected with the Federal Bank of Canada at Toronto where he remained until October, 1886, when he entered railway service as a biller in the freight department of the Union Pacific at Council Bluffs, Iowa. In the following year he entered the storekeeper's office at Omaha as a bookkeeper and in March, 1891, he became a clerk in the office of the purchasing agent. Mr. Smith was promoted to chief clerk to the purchasing agent in 1892, a position he held for 20 years, until September 1912, when he was promoted to purchasing agent of the Union Pacific unit of the System.

## Obituary

**John T. Downs**, superintendent of rolling stock of the Michigan Central, with headquarters at Detroit, Mich., died in that city on July 7.

**Joseph Seifert**, secretary and auditor of the Duluth, Missabe & Northern, with headquarters at Duluth, Minn., died at his home in that city on July 6, at the age of 60 years.

**J. L. East**, car accountant of the Illinois Central, with headquarters at Chicago died at his home in that city on June 18. At the time of his death he had completed 43 years of service with the Illinois Central.

**Herbert R. Kimball**, master mechanic of the Duluth & Northern Minnesota, with headquarters at Knife River, Minn.,

from 1910 until its operation was discontinued in 1922, died on June 29 at International Falls, Minn.

**Ward L. Wilt**, special representative of the Pennsylvania at Chicago and a member of the staff of the vice-president, died at St. Luke's Hospital in that city on July 2, after an illness of several months. Mr. Wilt was 59 years of age and had served in the mechanical, accounting and executive departments of the Pennsylvania for 40 years.

**Jesse G. Lorton**, special representative of the general manager of the St. Louis-San Francisco, with headquarters at Springfield, Mo., and formerly a division superintendent on that road, died at his home in Springfield on June 1. Mr. Lorton had been a trainmaster at Dubuque, Iowa, and Kankakee, Ill., and superintendent at Fulton, Ky., on the Illinois Central from 1901 to 1904, trainmaster on the Missouri-Kansas-Texas at Parsons, Kan., until 1905 and superintendent on the Missouri Pacific at McGehee, Ark., and Monroe, La., until 1907. He then became superintendent on the Frisco at Fort Scott, Kan., and later at Birmingham, Ala., and at Oklahoma City, Okla. Ill health forced him to abandon railway work in January, 1912, but he returned to the Frisco in March, 1920, as a chief dispatcher. In 1922 he was promoted to trainmaster and in August, 1923 he was placed on the staff of the general manager as a special representative. During the World war Mr. Lorton served in the United States Army as a captain.

**Louis H. Evans**, formerly engineer of track elevation of the Chicago & North Western and principal assistant engineer of the Delaware, Lackawanna & Western, died at his home at Mast Hope, Pa., on June 4. Mr. Evans was born at Kenosha, Wis., on December 21, 1851, and after graduating from the University of Michigan, entered railway service as a rodman on the North Western. From 1873 to 1896 he served successively as assistant engineer on the Delaware division of the Erie, as assistant engineer on the North Western, as a member of the engineering forces of the Central Branch Union Pacific (now part of the Missouri Pacific) and as assistant engineer and division engineer on the North Western. In 1896 he was promoted to engineer of track elevation of the North Western, with headquarters at Chicago, then being appointed division engineer of the Chicago district and the Helena division in January, 1900. In April of the same year Mr. Evans was appointed principal assistant engineer of the Delaware, Lackawanna & Western, a position he occupied until October, 1900, when he became associated with a firm of railroad contractors. Since 1915 he had been practically retired from active business life.

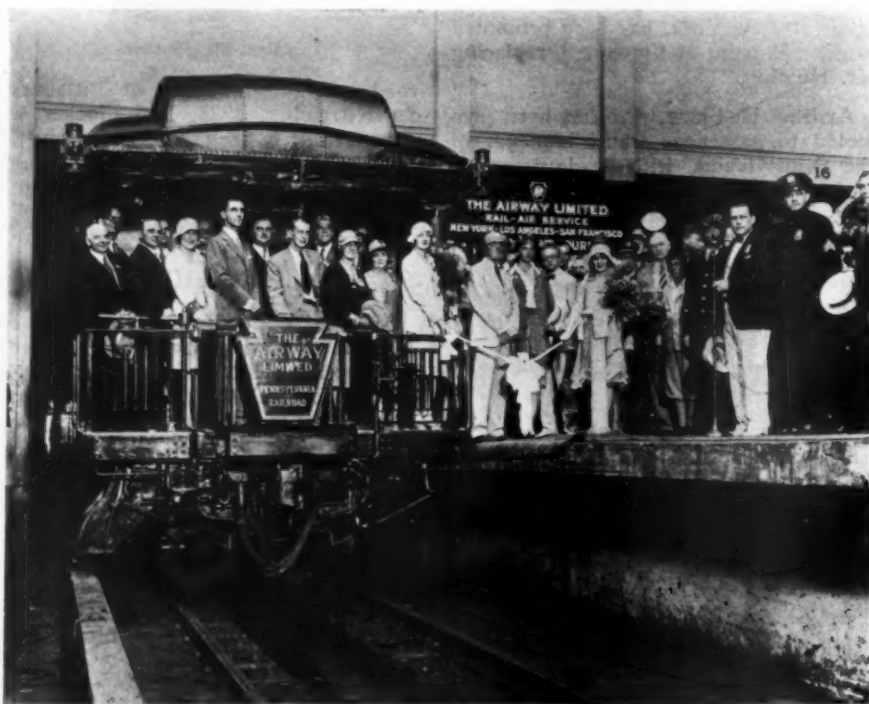
**A. T. Abbott** superintendent of the Iowa division of the Chicago, Rock Island & Pacific, who died at Des Moines, Iowa, on June 2, had been connected

with that railway for more than 45 years. He was born on April 29, 1860, at Morris, Ill., and entered railway service as a telegraph operator on a short road which is now a part of the Rock Island. In 1882 Mr. Abbott was appointed dispatcher on the Rock Island at Horton, Kan., and six years later he was advanced to chief dispatcher at that point. For three years, from 1890 to 1893, he was out of railway service and when he returned he was appointed dispatcher on the Rock Island at Davenport, Iowa, then being again advanced to chief dispatcher at Horton. He was promoted to superintendent at Horton in 1895 and in 1897 he was further promoted to superintendent of the Kansas division at Herington, Kan., where he remained until 1902 when he was transferred to the Nebraska division, with headquarters at Fairbury, Neb. Later in 1902 he was transferred to the Colorado division, with headquarters at Colorado Springs, Colo., and in 1909 he was again transferred to the Iowa division at Des Moines. From 1913 to 1922 Mr. Abbott served as superintendent of the Des Moines Valley division, with headquarters at the same point, and at the end of that period he was appointed acting general superintendent at Des Moines. In 1924 he returned to the Iowa division as superintendent, a position he held until his death.

**George H. Ross**, former executive vice-president of the Toledo, St. Louis & Western (now part of the New York Chicago & St. Louis) and the Chicago & Alton, with headquarters at Chicago,

died at Los Angeles, Cal., on July 1. Mr. Ross had made his home in California since ill health forced his retirement from railway service in 1911 when he had completed 34 years of railway work. He was born at Boston, Mass., on August 29, 1854 and after attending the Dwight School in that city began his railway career as a clerk on the Chicago, Burlington & Quincy at Council Bluffs, Iowa, in 1877. Mr. Ross continued with the Burlington until 1898, occupying successively during that time the positions of chief clerk to the division freight and passenger agent, division freight and passenger agent, second assistant general freight agent, first assistant general freight agent, manager in charge of the reorganization, of the car and special time freight departments and superintendent of car and special freight service. In August, 1898, he was appointed traffic manager of the Indiana, Illinois & Iowa (now part of the New York Central), with headquarters at Chicago, and from 1902 to 1904 he was president of the Union Depot Bridge & Terminal Company (now the Kansas City Terminal) at Kansas City, Mo. He was then appointed general traffic manager of the Toledo, St. Louis & Western and in addition in 1905 he was elected vice-president, with headquarters at Chicago. Mr. Ross was executive vice-president of the Toledo, St. Louis & Western and the Chicago & Alton from 1907 to April, 1911, and for one year he was also a vice-president of the Minneapolis & St. Louis and a road which is now a part of that company, the Iowa Central.

\* \* \* \*



International Newsreel Photo

#### Inauguration of T. A. T. Coast-to-Coast Air-Rail Service

Ceremonies were held on July 7 at Pennsylvania Station, New York, to mark the initial departure of the Pennsylvania's "Airway Limited" on the first leg of this new 48-hour transcontinental passenger service.